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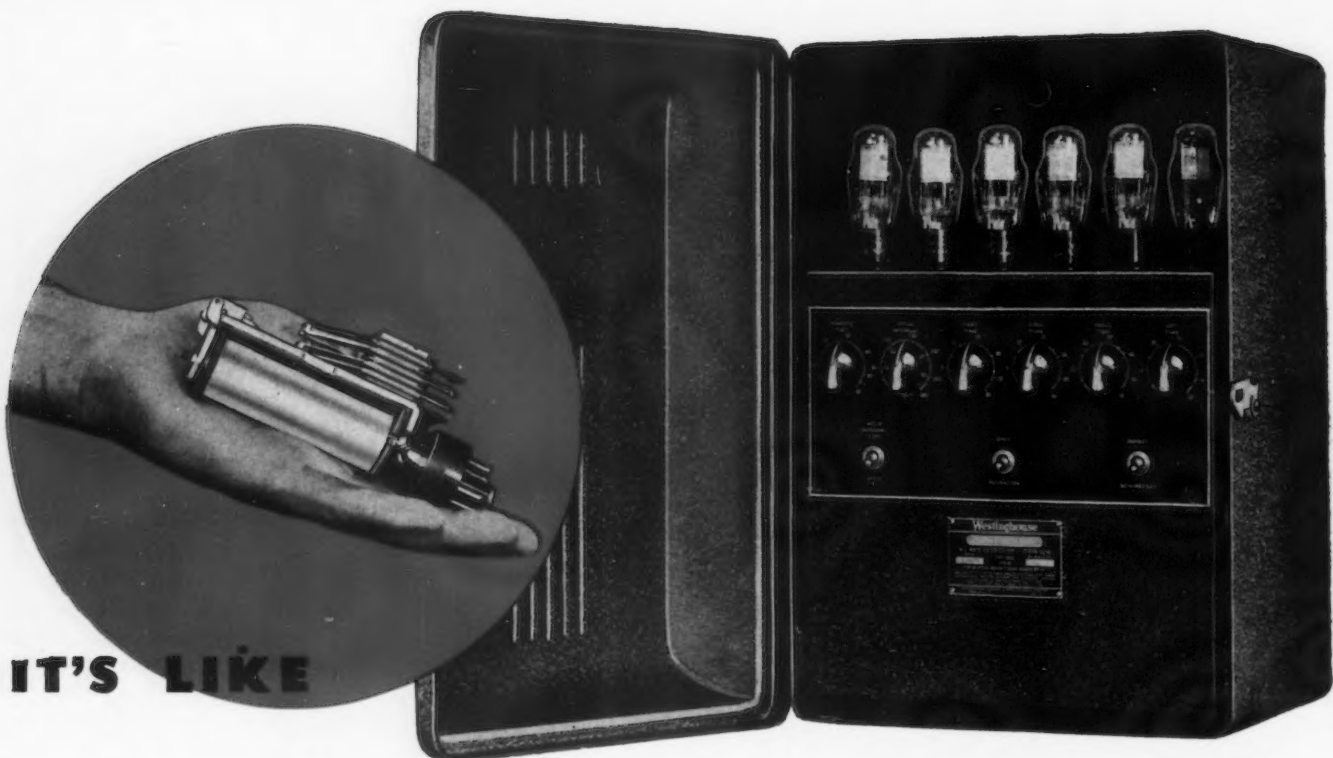
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IT'S LIKE

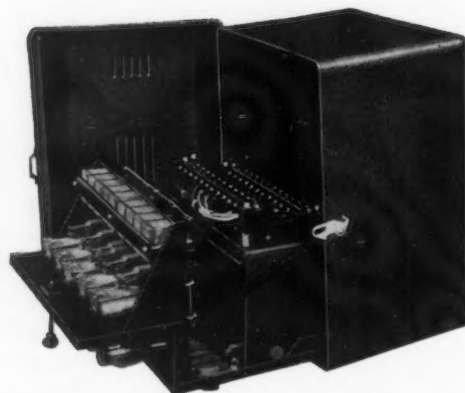
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THE IRON AGE

• •
AUGUST 6, 1942

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ESTABLISHED 1855



Retribution Devoid of Sentimentality

WE Americans are a tender-hearted people, but not altogether consistent in our tenderness.

For example, we teach our infantrymen the technique of bayonet fighting, the lesser part of which, perhaps, is the operation of sticking the bayonet into one's adversary, and the greater part having to do with the use of the gun butt to effect an indescribable foul. We learn how to pierce, burn, blow-up, blast and batter our adversaries and having done so, we seek out and sort their remains, honor them with military funerals, fire salutes and blow taps over them; photograph the process of glorifying these implacable enemies and send pictures of them with publicity releases to all the newspapers.

We catch saboteurs who come to blow up our industrial establishments, bridges, department stores and water works, and instead of shooting them on the spot, as our delightful antagonists would do to our boys in similar case, we convene the Supreme Court to leave no stone unturned in their defense; thereby extending a cordial invitation to other saboteurs to come over and meet our best people.

We learn from columnists and from diplomatic officials who have returned from the Far East of the degradations heaped upon our unfortunate fellow countrymen who have been captured by the Japanese. Yet other columnists and writers say that we must never descend to such levels but by our treatment of Japanese prisoners give an object lesson in the application of the milk of human kindness.

Stuff and nonsense. This is war; not a tug-of-war. It is war to the finish and devil take the hindmost. It is eye for eye and tooth for tooth; a jungle battle in the West and the East in which our antagonists show no mercy and deserve no more of it than one would show toward insane and obsessed leopard men whose pleasure is to kill and tear innocent victims with their artificial claws.

This silly, sanctimonious sentimentality, is akin to the emotional intoxication that causes some women—and men too—to hover tenderly over convicted murderers and other criminals who have committed revolting crimes. I hope that this same spirit of tenderness towards our enemies will not be so overpublicized that it will affect the men and women who are at work in our industries. For in that case, it might lead to planes that would not fly, guns that would not shoot, and tanks that would not run.

J. W. Van Dine



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National Emergency Gear Steels

By E. F. DAVIS

Chief Metallurgist, Warner Gear Division
Borg-Warner Corp., Muncie, Ind.

UNTIL 1941, the gear industry had available over 40 different recognized alloy steels. In addition, the manganese or alloy content could be varied or the carbon restricted to a narrow range; the steel could be resulfurized or treated with special deoxidizers such as grainal; or such modifications as were deemed advantageous to a particular machining or heat treating practice could be made. There was always a steel producer ready and willing to comply with the customer's specific requirements.

Although the Society of Automotive Engineers steel specifications have been regarded as standard for many years throughout industry in America, Canada and several foreign countries, many consumers developed steels to suit specific needs. Those of General Motors, Ford, International Harvester, and Chrysler serve as examples. In addition, the aircraft industry and the Army, Navy, and quartermasters' agencies had specifications applicable to ordnance and aircraft materials. All of these have followed the general pattern of SAE standards, yet their minor differences have multiplied many times the number of steels actually employed for gears and other parts.

The American Iron and Steel Institute, having the means for ascertaining the relative tonnage of all steels delivered from the various steel mills, made a thorough compilation of the different types and

... Gear manufacturers, faced with ever-increasing shortages of alloy steels normally employed in such products, were finally faced with problem of making serviceable gears of the new N. E. steels. How they overcame this problem is described in a series of two articles, of which this is the first.

amounts purchased and found there were in existence several thousand different steel analyses. By eliminating minor modifications of similar steels, the Institute finally reduced these to 81 basic alloy steel specifications. These steels either were sold in sufficient quantities to justify their inclusion or were of special application necessary to manufacturing.

The Society of Automotive Engineers made a similar compilation and reduced the number of alloy steels from 67 to 42 in the 1941 SAE Handbook, with 11 of these 42 listed as of secondary importance in tonnage consumed. But the canvass of the automotive and parts makers was, of course, much more incomplete, and possibly represented less than 20 per cent of the alloy steel consumed in America.

The presentation of the new Institute specification booklets to the public early in 1941 was followed by an immediate attempt to impose these as standard upon industry by overzealous sales agencies. Some warehouses stocked only the Insti-

tute listed steels and in some instances refused to accept orders for SAE steels. This aroused resentment among buyers in the automotive and allied industries and also in Army, Navy, and quartermaster departments, where specifications were based on SAE steels. Furthermore, there were in existence several million blue prints bearing SAE designations for steel. Several abortive efforts were made by other specification writing societies to alleviate the confusion existing until finally the Office of Production Management insisted that the Steel Institute and SAE cooperate and establish similarly numbered specifications based on the SAE numerical system.

After a series of meetings between the two societies, differences were adjusted with the final amicable result that both now use interchangeable numbers except that the Institute carries a much longer list. The reason for this is that the steel industry, which sponsors the American Iron and Steel Institute, supplies many purchasers not in the

automotive group, such as the machine tool builders, railroads, electric and petroleum industries, etc.

Nickel Shortage Alarming

When the nickel shortage became apparent, gear manufacturers were alarmed. Any deviation from the nickel bearing steels was regarded with the greatest apprehension because these steels were well established in the gear industries as dependable types. These included such SAE specifications as 2512, 2515, 3140, 3145, 4320, 4620, 4640, 4815, and 4820. These groups, with the exception of the chromium and high manganese steels, represented the commonest gear steels with many years of satisfactory operation for transmission and rear axle gears in passenger cars, trucks, and buses.

Necessity immediately forced several gear makers to substitute chromium-vanadium types, but no sooner were a few heats delivered and in process than it became apparent that any shifting to the chromium-vanadiums was futile because the war was shutting off supplies of vanadium.

While it is difficult to arrange these changes in clean cut chronological order, it might be stated that the next step, from September to December, 1941, was a shift-over to the chromium-molybdenum

steel, SAE 4120. This steel has never been popular in the gear industry because of the difficulties attending its heat treatment and its lack of core ductility. It is true that it had found some favor in the agricultural industry where the service is usually less severe and intermittent, but it never acquired a substantial footing among motor car builders.

Several times during the past 20 years it has been resurrected, but invariably after testing, it was again discarded. As late as 1940 the chromium-molybdenum steel was proposed as an SAE specification, but was rejected by the metallurgists composing the Iron and Steel Committee of this society because of its minor application, no standardization of chromium content, and unfavorable reports in comparison with other steels. It finally appeared in the 1942 SAE list as SAE 4119 and in the Institute list as A4119 and A4120.

With the additional burden thrown upon chromium, the War Production Board quickly realized that, unless this alloying element was conserved, there would be insufficient quantities to supply the war program. Early in 1942 gear makers found they were denied their three most valuable gear steel alloying elements, namely: Nickel, vanadium, and chromium. It was

obvious, therefore, that new compositions would have to be developed to enable gear manufacturers to continue supplying a product with a reasonable certainty of satisfactory service. Gears used in trucks, buses, and certain army vehicles were equally under the WPB ban. Of the elements still available, manganese and molybdenum were the only ones left, and it was obvious that any future alloy steels must be built up from these two elements. Some sources of manganese were shut off by the war, and demands, due to increased steel production, eventually caused WPB to conserve available supplies.

Molybdenum Resources High

The United States is particularly fortunate in having ample supplies of molybdenum. In this country, over 45,000,000 lb. are produced annually, greatly exceeding the world supply before the outbreak of the war. But, so unpredictable are the demands for alloy steels that even molybdenum may be eventually restricted because of the high percentage going into high-speed steels to replace tungsten.

A joint group representing the American Iron and Steel Institute and the Society of Automotive Engineers met in Detroit early in December, 1941, and 20 steel compositions, named the NESS steels (National Emergency Steel Specifications), were proposed. This name was later shortened to NE steels. In order not to conflict with any established steel specifications by the S.A.E. or the Institute, and because it was believed that these would not be permanent, the first 16 compositions were assigned the type numeral 8000 and four silicon-manganese steels for leaf springs were given the 9200 series designation. The latter are outside the scope of gear steels and will not be discussed, but the 16 in the 8000 series are shown in Table I.

These steels were literally pulled out of the air and comprise a group without any history of performance. Hence, the first attitude of the gear maker as well as the steel buying industries in general was that of avoidance and suspicion. When it finally became apparent, however, that the former types were no longer available except for certain very special applications, steel buyers became more receptive and were willing to test out these new steels to determine their worth.

When inquiries were made as to

TABLE I
National Emergency Steels

Designation	CHEMICAL COMPOSITION LIMITS, PER CENT								
	Carbon	Manganese	Phosphorus Max.	Sulphur Max.	Silicon	Nickel	Chromium	Molybdenum	Vanadium
NE 8024	0.22/0.28	1.00/1.30	0.040	0.040	0.20/0.35			0.10/0.20	
NE 8124	0.22/0.28	1.30/1.60	0.040	0.040	0.20/0.35			0.25/0.35	
NE 8233	0.30/0.36	1.30/1.60	0.040	0.040	0.20/0.35			0.10/0.20	
NE 8245	0.42/0.49	1.30/1.60	0.040	0.040	0.20/0.35			0.10/0.20	
NE 8339	0.35/0.42	1.30/1.60	0.040	0.040	0.20/0.35			0.20/0.30	
NE 8442	0.38/0.45	1.30/1.60	0.040	0.040	0.20/0.35			0.30/0.40	
NE 8447	0.43/0.50	1.30/1.60	0.040	0.040	0.20/0.35			0.30/0.40	
NE 8547	0.43/0.50	1.30/1.60	0.040	0.040	0.20/0.35			0.40/0.60	
NE 8620	0.18/0.23	0.70/0.95	0.040	0.040	0.20/0.35	0.40/0.60	0.40/0.60	0.15/0.25	
NE 8630	0.27/0.33	0.70/0.95	0.040	0.040	0.20/0.35	0.40/0.60	0.40/0.60	0.15/0.25	
NE 8724	0.22/0.28	0.70/0.95	0.040	0.040	0.20/0.35	0.40/0.60	0.40/0.60	0.20/0.30	
NE 8739	0.35/0.42	0.75/1.00	0.040	0.040	0.20/0.35	0.40/0.60	0.40/0.60	0.20/0.30	
NE 8744	0.40/0.47	0.75/1.00	0.040	0.040	0.20/0.35	0.40/0.60	0.40/0.60	0.30/0.30	
NE 8749	0.45/0.52	0.75/1.00	0.040	0.040	0.20/0.35	0.40/0.60	0.40/0.60	0.20/0.30	
NE 8817	0.15/0.20	0.70/0.95	0.040	0.040	0.20/0.35	0.40/0.60	0.40/0.60	0.30/0.40	
NE 8949	0.45/0.52	1.00/1.30	0.040	0.040	0.20/0.35	0.40/0.60	0.40/0.60	0.30/0.40	

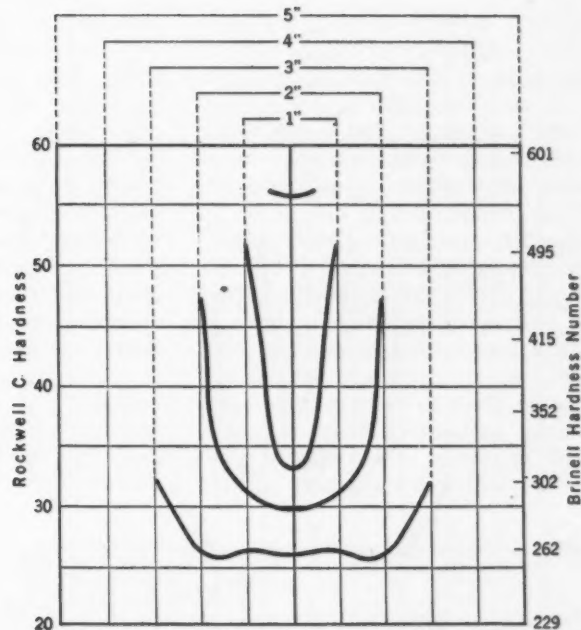
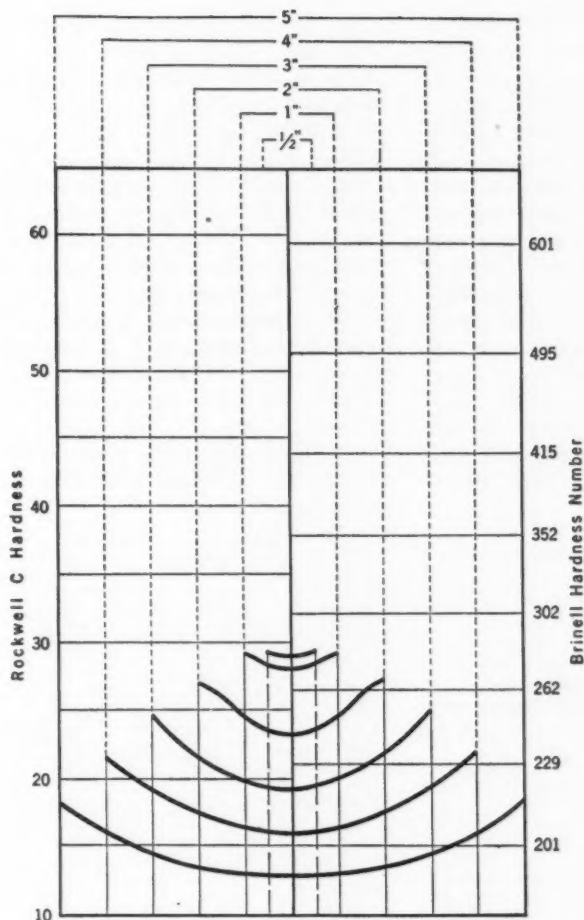


FIG. 1—The effect of the addition of 0.20 per cent molybdenum in an 0.40 per cent carbon steel bar is shown in these hardness distribution graphs. The chart at left shows the hardness distribution in an SAE 1040 round steel bar, oil quenched from 1525 deg. F. At right, hardness distribution is charted for a fine grain, carbon-molybdenum round steel bar, oil quenched from 1525 deg. F.

where these steels could be bought, it was found they did not exist and were unobtainable. However, the WPB soon came to the rescue and made special rulings permitting heats of each of these steels to be made and small lots allocated to a number of different plants for testing.

Those designated as the 8000 series fall into two general groups: The manganese-molybdenums and the chromium-nickel-molybdenums. Those ranging from NE 8024 to NE 8547, consisting at present of eight steels, comprise the first or manganese-molybdenum group. The remaining eight steels, numbered from NE 8620 to NE 8949, are the chromium-nickel-molybdenums, and represent the second group. The inception of the chromium-nickel-molybdenum steels was based on the theory that diffusion of small amounts of several alloys might accomplish as much as larger quantities of fewer alloys, and, at the same time, take care of alloy residuals. Three different types are represented in the NE steels, namely: Carburizing grades, semi-hardening and full-hardening steels.

Very little history is available of the manganese-molybdenum types

except that similar compositions were tried out for gears between 1930 and 1932. At that time, the experiences with these steels were not encouraging because of the lack of uniform hardening properties, gear distortion, and manganese segregation. Steel producers that had been promoting these steels finally discontinued advocating them for gear purposes. Since then, however, grain size came under more definite control, steel making has advanced considerably, and annealing and heat treating processes and equipment have improved. It is possible that this steel, correctly made and properly processed, may eventually prove an excellent alternate for other alloy types.

The higher carbon grades of manganese - molybdenums have never been completely discarded in this country and have been employed quite extensively in England for agricultural and railroad uses. They are reported to be excellent for parts that are hardened and tempered. According to data supplied by Climax Molybdenum Co. these steels compare favorably with SAE 4140 and SAE 4340 in hardenability.

Two British specifications for

manganese-molybdenum steels are as follows:

Element	Type I, Per Cent	Type II, Per Cent
Carbon	0.25 to 0.40	0.30 to 0.40
Manganese	1.30 to 1.80	1.30 to 1.80
Molybdenum	0.20 to 0.40	0.40 to 0.55
Sulphur	0.05 maximum	0.05 maximum
Phosphorus	0.05 maximum	0.05 maximum
Silicon	0.35 maximum	0.35 maximum

The British type I corresponds favorably with NE 8339, but there is none in the present NE list that exactly corresponds to the British type II, the higher molybdenum specification.

As nearly as can be determined at this time, the only manganese-molybdenum gears made to date are of NE 8442, which is a steel of 0.38 to 0.45 per cent carbon. This has replaced such gear steels as SAE 1340, SAE 4140, SAE 4640, and SAE 5140, and this same steel has also been used for transmission shafts. None of the carburizing types, such as NE 8024 and NE 8124, is reported yet in actual use.

As matters stand at present, the main obstacle to the wider adoption of the manganese-molybdenums is the lack of familiarity with their properties and insufficient experience in handling by gear makers.

However, early reports of investigators indicate that these steels possess good depth-hardening properties, they machine satisfactorily in all operations, and their published tensile values compare favorably with other alloy types of similar carbon content.

The NE chromium-nickel-molybdenum types are offered in an attempt to obtain the enhancing qualities of these three elements, but by using a lesser total amount of the alloys. A low alloy content really improves steel more than would be expected and more than is generally believed. For example, a steel containing 0.5 per cent nickel

was listed in the SAE specifications until the 1940 revision as SAE 2015. This steel was once used extensively for a low-priced nickel steel gear. These gears readily hardened in oil after carburizing, producing a file-hard wearing surface. Considering the small amount of nickel contained, these gears gave an excellent record for medium and light service. The same carbon steel without the nickel would not harden in oil.

A similar improvement in hardenability is noted when small amounts of molybdenum are in the steel matrix. The Climax Molybdenum Co. illustrates this differ-

ence in the accompanying hardenability charts, showing the hardness of SAE 1040 and a steel with the same carbon content but with a 0.20 per cent molybdenum addition. These charts are shown in Fig. 1. Chromium is also similarly potent. It follows, therefore, that minor amounts of nickel, chromium, and molybdenum should produce excellent alternate steels.

Most gear makers are inclined to look with favor on these new chromium-nickel-molybdenum steels, which includes three carburizing grades, namely, NE 8620, NE 8724, and NE 8817; and three oil hardening grades, NE 8744, NE 8749 and NE 8949.

The SAE and Institute steels that can be replaced by the various new NE steels are shown in Table II. As a rule, NE 8620 is employed as an alternate for the SAE 4615 grade and similar steels used for gears of light and medium duty. The NE 8724 and NE 8817 grades are used as substitutes for SAE 2515, SAE 4320, and SAE 4815 or SAE 4820, the deep hardening types generally used for large gears on trucks, buses, and other heavy duty services.

Because these steels are comparatively new, there is not much service data to base tangible conclusions upon, although considerable data is available on their hardenability and tensile values and some dynamometer tests have been made. A number of research departments in leading steel plants and motor car manufacturers, and the International Nickel and Climax Molybdenum Companies are conducting extensive tests on these steels.

A committee has been formed under the direction of the War Production Board, known as the Research Sub-Committee for Technical Advisory Committee (T.A.C.) to arrange for the efficient conduction of these tests. Tests are to include: Tensile, torsional, dynamometer, Charpy, and Izod impact tests not only at room temperature but at 0, -25, and -65 deg. F. Other properties to be investigated are machinability, response to carburizing and hardening, and grain coarsening temperatures. These data will be released as soon as available.

No doubt when this research is completed, some analysis modifications will be made and possibly some substitute analyses proposed. Even at this early date, there is some objection to the brittleness of NE 8724 for gearing and many are

TABLE II
NE Steel Substitutes for SAE and AISI Grades

Standard Series Designation				Possible NE Steel Alternates to Standard AISI or SAE Grades		
1942 AISI Number	1941 AISI Number	1942 SAE Number	1941 SAE Number	Number	Number	Number
A 1320 A 1330 A 1340	A 1321 A 1330 A 1340	1320 1330 1340 1330 1340	A 4027 A 4037 A 4047	NE 8024 NE 8233 NE 8245
A 2317 A 2330 A 2335 A 2340 A 2345 WD 2350 A 2515	A 2317 A 2330 A 2335 A 2340 A 2514	2317 2330 2340 2345 2515	2315 2330 2340 2345 2515	A 4027 A 4037 A 4063 A 4068 A 4068 A 4068 A 4027	NE 8024 NE 8233 NE 8339 NE 8442 NE 8447 NE 8547 NE 8817	NE 8620 NE 8630 NE 8739 NE 8744 NE 8749 NE 8949
A 3045 A 3120 A 3130 A 3135 A 3140 A 3141 A 3145 A 3150 A 3240 WD 3250	A 3045 A 3120 A 3130 A 3135 A 3140 A 3141 A 3145 A 3150 A 3240 3120 3130 3135 3140 3141 3145 3150 3240 3120 3130 3135 3140 X 3140 3145 3150 3240	A 4068 A 4027 A 4037 A 4063 A 4068 A 4068 A 4068 A 4068 A 4068 A 4068	NE 8442 NE 8024 NE 8233 NE 8339 NE 8442 NE 8447 NE 8447 NE 8547 NE 8442 NE 8547	NE 8744 NE 8620 NE 8630 NE 8739 NE 8744 NE 8749 NE 8749 NE 8949 NE 8744 NE 8949
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recommending replacement by a new composition to be known as NE 8720. This new analysis will be: 0.18 to 0.23 carbon, 0.70 to 0.90 manganese, 0.40 to 0.60 chromium, 0.40 to 0.60 nickel, 0.25 to 0.35 molybdenum. The increase in the molybdenum is to assure a minimum of 0.25.

It is to be hoped that users of NE steels will not attempt to follow the procedure, too common in the past, of continually modifying

standardized acceptable steels and applying hypothetical numbers to suit specific applications, thus creating confusion and unnecessarily increasing the number of these steels. The purpose of the standardization project is to reduce the number of steels to a minimum as well as to conserve strategic materials.

Of the chromium-nickel-molybdenum types, three are suitable for oil-hardening gear steels. These

are NE 8744, NE 8749, and NE 8949, and they could replace SAE 5140, SAE 4640, SAE 3145, and SAE 3240. However, there is no record at present of these substitutions having been made, although some firms are experimenting along these lines.

Editor's Note: In next week's issue the author will describe the Amola or 4000 series steels, as well as the equipment used in the heat treatment of steel gears.

Electronic Rectifiers Applied to Machine Tools

IN place of the usual d.c. generating plant and its distribution system, one of the largest aircraft engine manufacturing plants in the Middle West has installed a large number of individual electronic rectifying units for each of the machine tools requiring d.c. power for their functioning. These applications include magnetic chucks and variable speed d.c. motors on grinders and other machine tools.

The d.c. power supply units each consist of a small two-tube electronic rectifier mounted directly on the base of the machine. Input is taken directly from the 440-volt a.c. line which is already wired into the main driving motor. The 110-volt d.c. wiring extends only from the rectifier to the magnetic chuck or other d.c. load.

Some of the advantages pointed out by the Mellaphone Corp., which supplied the equipment, are:

(1) Large savings in wiring materials and reduction in valuable man-hours ordinarily required to install d.c. distribution lines. Although over 250 miles of electrical wire and cables were necessary to transmit the a.c. power throughout this plant, practically no d.c. wiring was necessary, except internal connections at the machines.

(2) Elimination of loss of voltage which occurs in long d.c. lines.

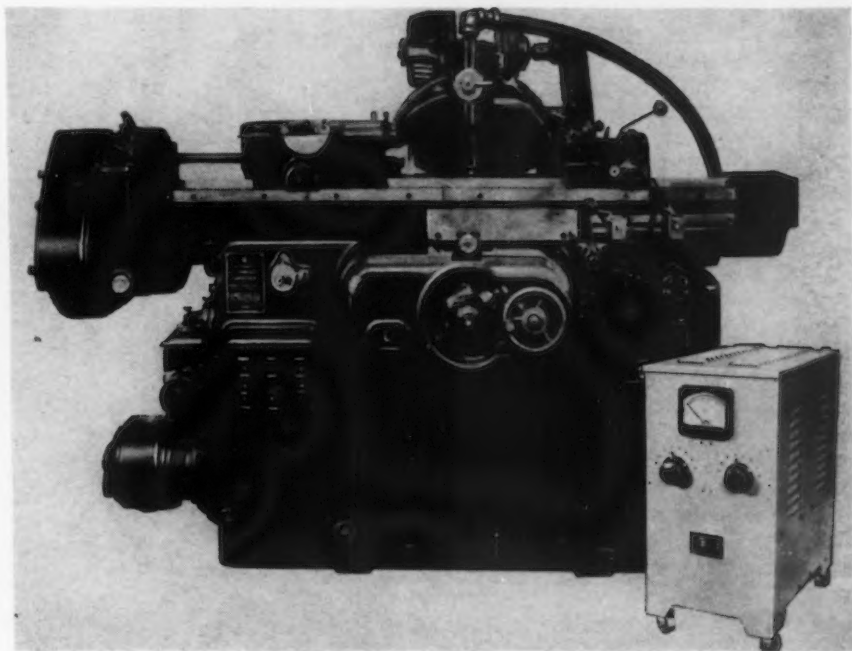
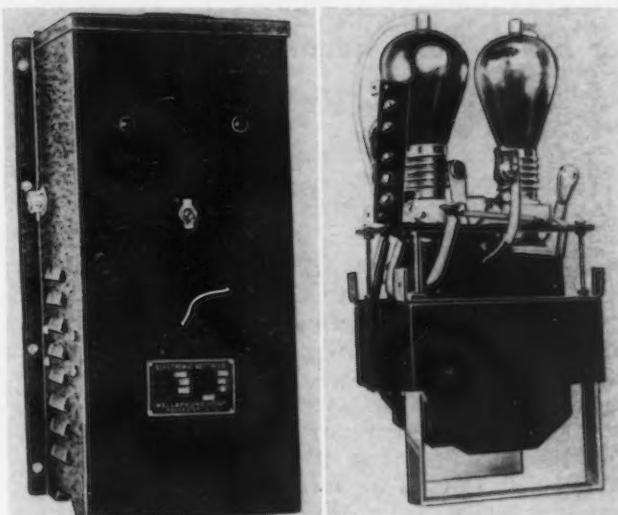
(3) The individual power supply of each machine makes it independent of all the rest, as far as d.c. power is concerned.

(4) The confusion of two different types of power wired throughout the building has been eliminated.

(5) Since electronic rectifiers contain no moving parts, maintenance and attention are reduced to a minimum. The use of heavy

INTERNAL and external views of a small Mellaphone electronic rectifier used for supplying 110-volt d.c. to a magnetic chuck on a grinder. Two 6-amp. half wave tubes are shown mounted on a 440-volt transformer.

THE variable speed d.c. motors on this J & L precision thread grinder are powered by the electronic rectifier shown, incorporating 15-amp. mercury vapor tubes.



duty industrial type mercury vapor tubes minimizes tube replacements and provides high electrical efficiency.

The availability of the equipment and speed in delivery are also an important consideration in this large installation.

Training Women for War Work

By J. B. NEALEY

... Fear of operating high powered machine tools can be overcome by preliminary "conditioning" on light tools or bench work, according to the experience of a small arms plant.

MANPOWER is marching out of industry, but womanpower is marching in, and industry likes it. The women like it, too, for many are leaving "white collar" jobs, such as typing, stenographic and secretarial work for the factory. Only it's clean slacks and shirtwaists instead of greasy overalls. Just as they forced the replacement of the old-time saloon with the genteel cocktail bar, women are slowly bringing the refinements and quiet efficiency of the office into the more or less noisy purlieus of the factory.

At the start, the women are frightened by power-driven machines that chew up and shred steel at high speed. At first women must be "conditioned" by giving them light work where they get acquainted with steel at first hand by filing and other bench work, sensitive drill presses, etc. In close proximity to the machines, they soon become used to them. Finally, they are put onto one with an experienced operator. They find that handling this monster of great power is ease personified, that it is sensitive to their slightest touch. They learn that the work they can do with it is more delicate than the fine old lace made by their grandmothers. They master their fear and then the machine.

They always knew that they had a more sensitive touch than men, and here is the pulsing, living truth of it. They realize that they are working to closer toler-

ances than the men—spoiling less work. Pride of accomplishment is born—good workmanship follows. Then their housekeeping instinct asserts itself. They keep their machines clean and in good order. Steady production results.

The war labor force will be expanded to 15,000,000 persons by the end of 1942 and to 23,000,000 workers during the year following, ac-

cording to estimates by WPB officials. Millions of new workers will be required and a large portion will be women. Looking back to World War I, it is found that 25 per cent of workers in war industries were women, while today only 10 per cent are women. If this comparison can be taken as an indicator, a tremendous industrial conversion from manpower to womanpower has only just started. At the bomber plant of the Ford Motor Co. it is expected that 25 per cent of the assembly line workers will be women. The ratio of female to male operators of precision machines is increasing right along at Curtiss-Wright and other big companies.

How do individual companies handle this problem? One concern experiencing the benefit of the female industrial influx has been

INSPECTION of small arms components is an ideal occupation for a woman. Even the good looking ones are more patient and painstaking than men on this class of small work.



prominently identified with fire-arms manufacture for many years. Robert Browning working with this concern developed the Browning machine gun, long standard with the U. S. Army. Recently, this company, working with the Ordnance Department of the U. S. Army, has developed the 37-mm. gun, a super-machine gun, based on the Browning principle. It has two big plants in mass production on machine guns and on the 37-mm. guns, both anti-aircraft and air-craft type.

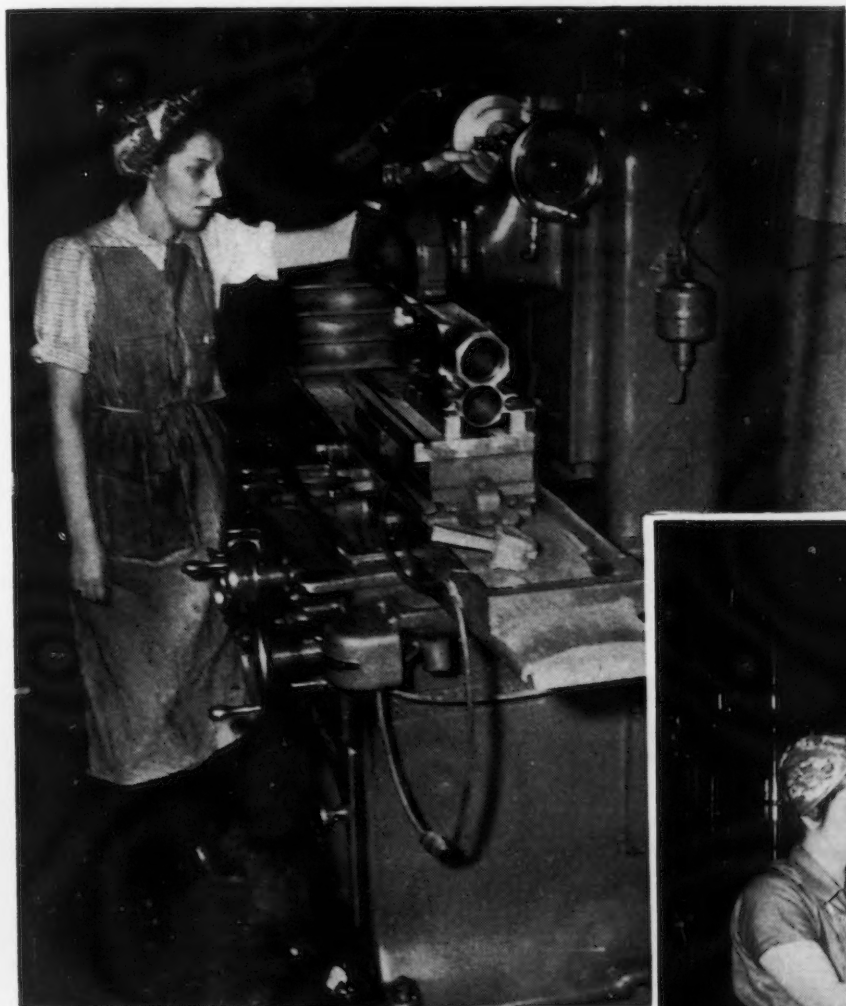
This plant making the 37-mm. guns employs more than 2000 per-

sons, of which 20 per cent are women. With the increasing divergence of manpower to the fighting forces, this company anticipates that the proportion of women will shortly be raised to 60 per cent. This concern welcomes women as a real contribution to efficiency and increased production. It has a well worked out schedule by which the women are first put on simple bench work, then, as their aptitude asserts itself, progress from filing to the simple drill press, then to surface grinders, lathes, profilers, etc., and finally to the large auto-matic engine lathes, turret lathes

and screw machines. In fact they operate practically every type of machine. While familiarity may not breed contempt, these machines are a real outlet for women's creative instinct and they push them to the limit.

This concern has ruled out the flowing skirt and sleeves as hazardous and has caused the substitution of slacks and sleeveless shirtwaists or sweaters. The hair, also, must be confined with nets and the wearing of low heeled shoes is considered most important. To an old-time production man accustomed to dirt, sweat and grease in profusion, the neatness and quiet efficiency of the new type of woman going into industry is a revelation.

Schools for the training of foremen, supervisors, inspectors, cutter grinders, etc., are maintained by this company both for men and women. Classes are held 24 hr. a day, seven days a week, and all those attending are paid while they learn. As a morale builder, this company, which operates three large plants, has an athletic association with leagues for softball, baseball, basketball and golf, and has a pistol and rifle club. The women heartily participate in these activities.



ABOVE

SURFACE grinding of machine gun components and light cannon is now being performed by women at a well-known New England arms factory.

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NEXT to light inspection work, the sensitive drill press is a machine best suited for female labor. Use of box jigs reduces the "human element" of precision to practically zero. Girls are often faster than men at this type of work.



Tipped High Speed

MOST machine shops have experienced breakage of solid high speed steel tools. This breakage usually occurs on cutting tools of special shape, such as are used to machine a small section inside diameters or grooves. The hardening strains produced when a small section of high speed steel abuts a larger section often cause the tool to break off through the small section when the cutting strains are applied. Tools that require sharp corners in their construction or tools that require a bending operation often are a source of excessive tool breakage also. A good example of tools where sharp corners are required are dovetail form tools. Such tools often break off at or near the inside corners of the dovetail. Offset tools for boring or grooving operations frequently require the bending of the tool shank and the strains caused by bending and subsequent hardening are often a cause for breakage. Large tools subjected to heavy strains also cause much breakage trouble.

The breakage of solid high speed steel tools is eliminated by tipping the cutting edge area with a high speed steel tip, and using a tough alloy steel for the balance of the tool. The General Tool & Die Corp. is producing such tools in large quantities by the use of its new process of tipping tools with hardened high speed steel tips without affecting the hardness during the brazing operation. This company is constantly solving tool breakage problems by this method. The success attained by General Tool can be best explained by means of several sketches of tools where tool breakage has been overcome. For greater clarity, sketches of parts machined are also included.

A recent example of successfully solving a serious tool breakage problem by the use of tipped H.S.S.

By LEO J. ST. CLAIR
President, General Tool & Die Corp.,
East Orange, N. J.

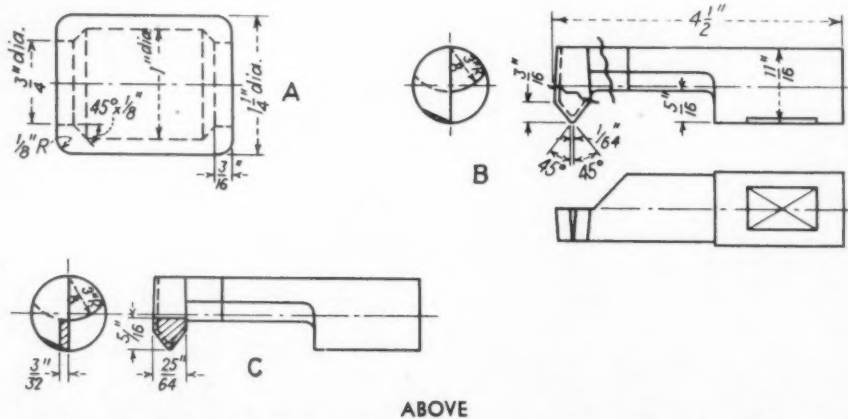
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tools is shown in Fig. 1. This tool had to produce an undercutting operation in a tough alloy steel cylinder. The part machined is shown at A. The solid H.S.S. tool used to do the undercutting operation is shown at B, and the tipped H.S.S. tool that replaced the solid tool is shown at C.

The tipped H.S.S. tool was made by using an 8 per cent cobalt H.S.S. tip $3/32 \times 1/4 \times 25/64$ in. with a Rockwell hardness of 64 to 65 C. The tipped tools have been in use

for two months with no breakage taking place. The tool life of the tipped tool averages three times the former solid H.S.S. tool. A 30 per cent increase in speed is also being used over the former tool. This increased tool life and higher speed has been made possible by the use of the 8 per cent cobalt H.S.S. which has a greater "red hardness" than the 18-4-1 H.S.S. formerly used, and also because of the two point increase in Rockwell hardness of the tip over the former solid H.S.S. tool. The user stated that the solid H.S.S. hardened to a hardness of 64-65 Rockwell C broke so often that he had to lower the hardness to 62-63 in order to reduce breakage.

The number of tools required



ABOVE

FIG. 1—At A is the part to be undercut. At B is the solid 18-4-1 high speed steel tool which had a tendency to break at the wavy lines. A tool tipped with an 8 per cent cobalt H.S.S. is shown at C. Breakage has been eliminated.

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RIGHT

FIG. 2—Grooving the SAE 6150 steel bushing shown at A caused much breakage of the solid H.S.S. tool shown at B. The tipped tool shown at C, using 1/216th the material, gave almost three times the tool life per grind.

Steel Tools

Give Improved Performance

per month was reduced from 300 solid tools to less than 50 tipped tools per month. This resulted in a saving of about \$1,500 per month on tool costs, along with a 20 per cent increase in output per day. This user has become enthusiastic about the tipped H.S.S. tools and is rapidly increasing his use of this type of tool because of the longer life and the increased speeds secured over his former solid tools.

Another solid H.S.S. tool which caused much breakage trouble was used to cut a $\frac{3}{32}$ in. wide x $\frac{1}{4}$ in. deep groove in a SAE 6150 heat-treated steel bushing. The tool breakage became so severe that the manufacturer attempted several times to have a milder steel substituted for the 6150 steel, but the user of this bushing refused to consider a substitute steel. The manu-

. . . The process of tipping low alloy steel shanks with previously hardened high speed steel blanks was first described in the March 26 issue. In this follow-up article, the author cites the superior performance of tipped tools whose design in solid form ordinarily make them susceptible to cracking. Longer tool life is obtained because a higher hardness than ordinarily permissible can be employed.

o o o

facturer dumped his problem in our lap and we have been successful in solving it. In Fig. 2, sketch A shows the part being machined. The solid H.S.S. tool is shown at B, while sketch C shows the tipped H.S.S. tool.

The solid tool in Fig. 2 was made

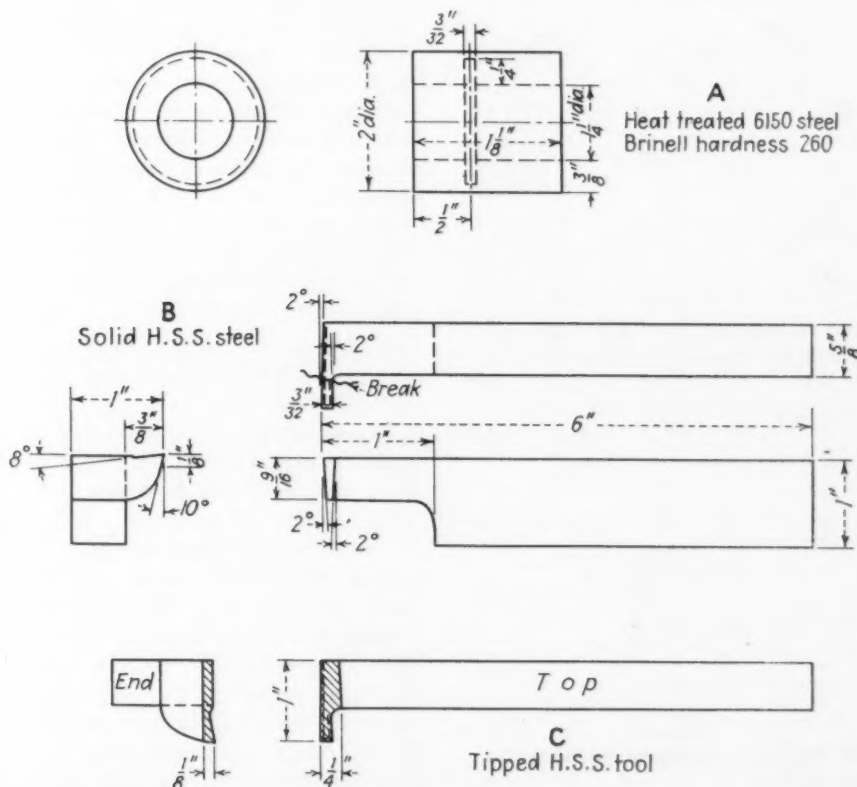
of 18-4-1 H.S.S. with a Rockwell hardness of 60-62 C, while the tipped tool had a 5 per cent cobalt H.S.S. tip with a hardness of 64 to 65 C. The solid tool's hardness had to be necessarily low in order to increase toughness of the narrow, weak cutting edge area so that tool breakage could be brought down to reasonable limits. Since the tipped tool used a tough alloy steel as a support for the tip, we were able to increase the hardness of the cutting element considerably and hence increase tool life and cutting speed.

The operating data on both tools are listed below:

	Solid H.S.S.	Tipped H.S.S.
Speed in r.p.m.	100	150
Feed per rev., in.	0.001	0.001
Pieces per grind.	30	80
Cut time per piece, min.	2 1/2	1 2/3
Production per hr.	15	20

An analysis of the above table shows clearly the advantages secured by substituting the tipped H.S.S. tool for the former solid tool. An increase in production of $33 \frac{1}{3}$ per cent was secured along with a real saving in tool cost. A total of 30 solid tools was required per month. Only eight tipped tools are now needed, resulting in a saving on tool cost of about \$130 monthly.

An interesting contrast is pre-



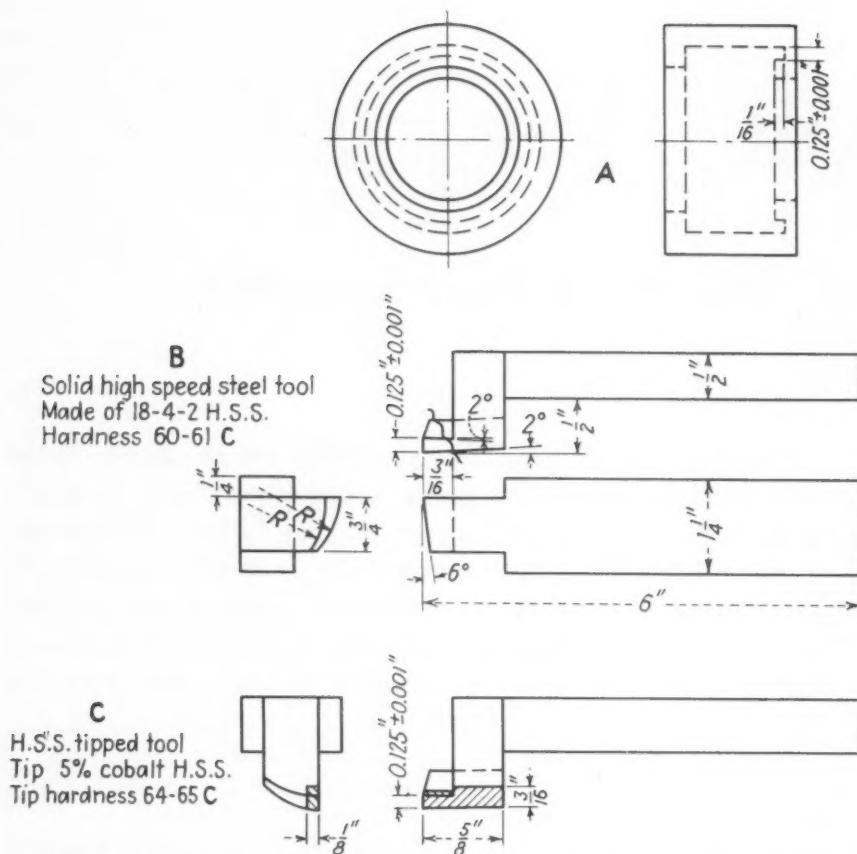


FIG. 3—Another internal recessing job that was hard on the solid H.S.S. tool shown at B. The tipped tool shown at C uses less than 1 per cent of the original material.

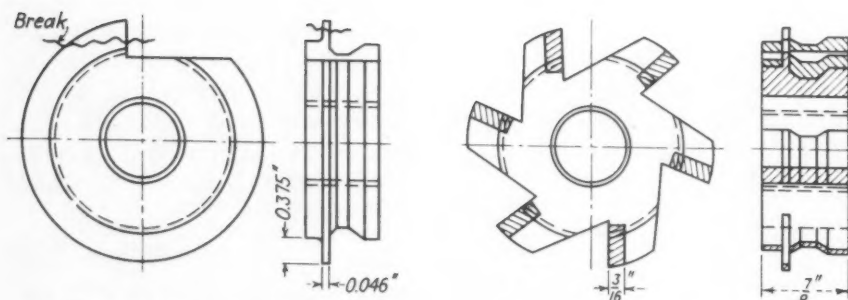


FIG. 4—Six-tipped circular form tool used to replace a solid H.S.S. form tool that frequently broke as shown by the ragged line.

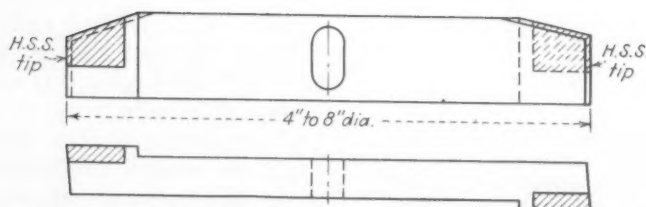


FIG. 5—A considerable saving in tool cost has been obtained on this large fishtail cutter by tipping.

sented in the amount of H.S.S. required for each tool. The solid H.S.S. tool contained 6 3/4 cu. in. of H.S.S. while the tipped tool requires but 1/32 cu. in. of H.S.S. (1 x 1/8 x 1/4 in.). The solid tool contained 216 times as much H.S.S. as the tipped tool.

The internal recessing operation shown in Fig. 3 proved to be a very discouraging one with a solid H.S.S. tool. A recess 0.125 in. wide by 1/16 in. deep necessitated a tool with a circular clearance on both sides of the cutting edge. The tool was rather expensive to build and difficult to harden without causing strains.

Sketch B, Fig. 3, shows the solid H.S.S. tool. Breakage usually took place at or near the jagged line. These tools cost the user \$11.75 in lots of 50, and 39 tools out of 50 broke before doing much work. The tipped tool replacing the solid tool is shown in sketch C. Ten of these tools were supplied and so far none has given trouble. Again a substantial increase in production is being secured due to the increase in hardness of the cutting edge and the higher red hardness in the 5 per cent cobalt H.S.S. tip as against the 18-4-2 H.S.S. in the solid tool. The tipped tool required less than 1 per cent of H.S.S. as compared to the solid tool.

The user of this tool presented us with another tough problem. This has to do with a circular form tool that has as part of the cutting edge an extension 3/8 in. deep by 0.046 in. wide which breaks off too easily. We felt sure that a circular form tool with six tips would overcome the difficulty. Fig. 4 shows the tool in question and our method of solving the difficulty. The reason we planned to use six tips is that our tough alloy steel support is never very far from the actual cutting edge.

We were sure to increase tool life and speed due to the fact that the solid circular form tool necessarily had a Rockwell hardness of 61-62 C, while we planned to make our H.S.S. tips 63-64 hard. We also were going to use an 8 per cent cobalt H.S.S. against the 18-4-1 used in the solid tool. The tipped tool cost about 30 per cent more than the solid tool in this case, but we estimated we would reduce tool cost as much as 60 per cent on this

job due to the tipped tool eliminating breakage.

The tool has now been in operation and has come up to and beyond our expectations. We have reduced cutting time about 30 per cent by increasing speed 50 per cent. Pieces between grinds showed an increase of 300 per cent.

A remarkable saving in tool cost has been realized on large fishtail cutters shown in Fig. 5. Hardening strains apparently weaken this type of tool and result in excess tool breakage. The heavy cutting strains that these tools are subjected to present a real problem and this problem was met by the tipped H.S.S. tool. Moreover we are able again to use a harder tip than the former solid H.S.S. and consequently tool life has been increased. Another interesting angle that is brought out by this tool is that the plant is now in the process of putting on new tips on the shanks that were originally tipped. This, of course, adds to the savings already realized. These worn tips are removed, new ones put on and ground to the original o.d.

The plant is daily overcoming the troublesome breakage of dovetail form tools. We salvage those form tools that have not broken in the dovetail area during their useful life, and also salvage those where the dovetail broke on initial use. With the tipped tool, the dovetail is milled in the tough alloy steel shank and hence breakage through this area is non-existent. Fig. 6 shows the construction of the tipped H.S.S. dovetail form tool. We use this construction when we are called upon to furnish new dovetail form tools. We usually have the H.S.S. plate used for the cutting edge hardened to 64-65 Rockwell C without any fear of trouble. By necessity, the solid dovetail form tool is usually two to three points softer than this. Hence the tipped H.S.S. form tool of this type will give a considerably longer tool life.

A recent application has resulted



FIG. 6—Troublesome breakage of dovetail form tools is eliminated by brazing a H.S.S. plate on a low alloy shank in which the sharp dovetail is cut.

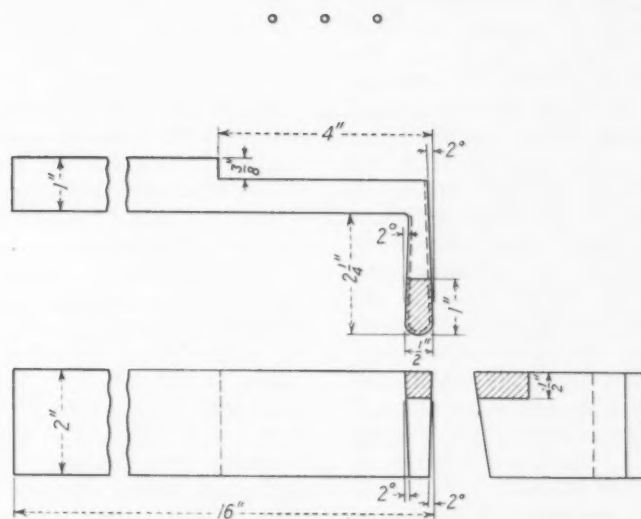


FIG. 7—Tipped planer tool used to make a deep recess not only saves scarce material but also reduces costly breakage.

in a fine increase in tool life and a real reduction in costly breakage. This tool is a planer tool used to make a deep recess in a cast iron part. It was formerly made out of a solid piece of 18-4-1 H.S.S., 19 in. long, 1 in. wide and 2 in. deep. Fig. 7 shows the tool as tipped with an 8 per cent cobalt H.S.S. tip $1 \times \frac{1}{2}$ in. Here are comparative data:

	Solid 18-4-1 Tool	8 per cent Cobalt Tip
Hardness, Rockwell C. . . .	60-62	64-65
Quantity of H.S.S., cu. in.	38	$\frac{1}{4}$
Average tool life, hr. . . .	1	5

In other words, the solid tool uses 152 times more critical material than the tipped tool. In addition, the breakage difficulty has been solved.

In all cases of tipping with hardened H.S.S. tips, the use of valuable H.S.S. is drastically reduced. Apart from this saving of vital cutting tool material, many tools are far superior as a tipped tool as compared to a solid tool from a construction standpoint. The much greater strength of the tipped tool definitely entitles it to serious consideration whenever tool breakage is pronounced with the solid tool. Also the fact that we can usually have a tip of H.S.S. somewhat harder than the corresponding solid tool entitles the tipped tool to serious consideration from the tool life standpoint and the consequent tool cost reduction that ensues. This new tipping process definitely points to new design thoughts for many types of troublesome tools.

... Guide to Alloying

AN interesting guide to the relative influence of certain alloying elements in steel, originally prepared by Carnegie-Illinois Steel Corp. and released by the American Iron and Steel Institute, affords in readily available form information for basing the use of certain elements or combinations of elements, in the lowest possible proportions, suitable for particular requirements. The elements covered by this guide include: Carbon, manganese, phosphorus, sulphur, silicon, chromium, nickel, molybdenum, vanadium, and copper in the ranges listed at the top of the accompanying tables. When the elements exceed the limits shown, the guide is not generally applicable, as the presence of some elements in greater quantities tends to impart a reverse or quite different effect.

With the exception of the special, stainless, or tool steel grades, the guide covers the major portion of steel production and consumption. When using the guide, however, it must be assumed that the steel will be given the proper heat treatment and processing in accordance with the best practice for the type involved. Unless specifically noted in the guide, ratings are based upon the use of the maximum

percentage shown for each element. Two columns are shown for carbon, covering ranges from 0.10 to 0.30 per cent and 0.30 to 0.85 per cent. Ratings relating to welding, corrosion, and deep drawing properties are based on the carbon range of 0.0 to 0.30 per cent instead of 0.10 to 0.30 per cent.

Numbers indicate the relative effect of the element upon properties of the steel or its response to certain processing operations. These numerical ratings are shown in the following key.

Suffix letters in the tables indicate the characteristic influence of the added element. The straight-line or *proportional* influence is indicated by the letter P; S indicates that *small* quantities are most effective; L indicates that *large* amounts are necessary for great influence of the alloying element; and where some certain effect reaches a maximum at an intermediate point and then decreases in intensity as more of the element is added, the letter N is used to indicate that *intermediate* amounts are most effective in obtaining the desired effect. Thus, while it is not possible to determine the exact limits of the elements needed to achieve a desired end, the suffix letter indicates large, small, or inter-

mediate amounts of any element are most effective; the number itself indicating the degree of favorable or unfavorable effect.

For example, small amounts of chromium are very effective in enhancing hardenability, so the suffix letter S indicates this predominant characteristic. In the case of carbon, the function as regards abrasion is a straight line function, so the P suffix is used. Large amounts of nickel are required to develop maximum corrosion resistance, while small quantities are relatively ineffective, which establishes the L suffix in the tables. In the case of manganese, maximum effects are obtained on the property of ductility in hot-rolled condition by the use of intermediate amounts, consequently the use of the N suffix.

When using the tables as a basis for making comparisons, it must be remembered that the merit ratings presented have been developed by consideration of the effect of various elements upon plain carbon steel, such as 1015, 1020, or 1030, with a minimum of 0.10 per cent carbon and 0.25 per cent manganese except in the case of flat-rolled steels. The composition is built up by the use of a single alloying element as listed, so that the effect of a single alloying element on a low or medium carbon base composition can be studied. The tables have been developed in broad terms and are primarily intended to outline trends, and should be considered as a source of information that will be useful as a reasonable guide in the selection, conservation, and economical utilization of alloying elements.

The accompanying tables summarize the ratings developed to indicate the effect of various elements upon the properties of steel and its response to certain processing operations. Fatigue reference, while important, has been omitted as so much depends upon the effect of the mechanical design and surface character. In table II, the items of forging, annealing, machining, hardenability, distortion, toughness, and wear are involved. In table III, abrasion, strength, toughness, cold fabrication, and welding are considered. In either case the tables serve to illustrate the many factors which add to or

Table A
Key to Numerical Ratings Used in the Tables

<div> <div>↑</div> <div>PLUS PERFECT</div> <div>↓</div> </div>	+10	Strong favorable effect
	+ 7	Moderate to strong favorable effect
	+ 5	Moderate favorable effect
	+ 2	Mild favorable effect
	+ 1	Slight favorable effect
	0	Little or practically no effect
	- 1	Slight unfavorable effect
	- 2	Mild unfavorable effect
	- 5	Moderate unfavorable effect
	- 7	Moderate to strong unfavorable effect
	-10	Strong unfavorable effect

Elements Used in Steel

detract from the properties desired or the performance required when selecting a steel type or composition for any particular field of use. Tables II and III serve as examples of how a table may be set up for

practically any application. While they do not give the exact combination for best performance under all shop conditions, they will guide the use in choosing the most promising elements and will indicate whether

small or large quantities are required to effect a property or response. They also indicate clearly what sacrifices must be made in one direction to obtain desirable properties sought in another direction.

Table I
Full Rating Number and Suffix Letter Giving the Relative Effect of Each Element on Several Properties or Conditions of Steel

	Carbon, 0.10 to 0.30 Per Cent	Carbon, 0.31 Per Cent to Eutectoid	Manganese 0.25 to 2.00, Per Cent	Phosphorus, 0.0 to 0.15 Per Cent	Sulphur, 0.0 to 0.30 Per Cent	Silicon, 0.0 to 2.0 Per Cent	Chromium, 0.0 to 1.10 Per Cent	Nickel, 0.0 to 5.00 Per Cent	Molyb- denum, 0.0 to 0.75 Per Cent	Vanadium, 0.0 to 0.25 Per Cent	Copper, 0.0 to 1.10 Per Cent
ABRASION RESISTANCE											
As rolled, as forged, or normalized	+ 3L	+10P	+ 8L	0	0	+ 2P	+ 7P	+ 3P	+ 4P	0	+ 1P
Annealing for pearlite	+ 3L	+ 5P	- 2L	0	0	- 2P	+ 3P	- 5P	- 3L	+ 2P	x
Carburizing, depth of case	0	- 4P	+ 5P	0	0	-10L	+ 2P	- 3P	- 2P	+ 2P	-10L
Corrosion	- 3P	- 6P	0	+10P	-10P	+ 2P	0	+ 6L	+ 2P	0	+10S
Creep	+ 2N	- 3P	0	0	0	0	+ 1P	0	+10P	?	?
Distortion, oil quenched	- 1P	- 2P	- 4P	- 3P	0	- 1P	- 4P	- 2P	- 3P	- 1N	0
Distortion, water quenched	- 2P	- 4P	- 7P	- 6P	0	- 3P	- 7P	- 7L	- 5P	- 2N	x
FABRICATION											
Deep drawing, breaking	- 4P	-10P	-10P	-10P	-10P	-10S	-10S	-10S	-10P	x	-10P
Cold forming, or bending, breakage	- 2L	-10P	+ 2N	-10L	- 7P	- 6P	-10P	+ 5S	+ 3S	+ 3P	+ 2P
Hot forging or rolling	+ 2P	- 7P	+ 7S	0	-10S	- 5P	0	- 6P	- 3P	0	-10S
Hardenability depth	+ 1P	+ 2P	+10P	- 3P	- 2P	+ 2S	+ 7S	+10L	+ 7S	+ 5I	xx
MACHINABILITY											
As rolled, as forged, or normalized	+ 2P	- 2P	- 6P	+ 6P	+10P	- 2P	- 2P	-10P	- 5P	0	x
Annealed to maximum pearlite	+ 2P	+ 3N	- 2L	+ 6P	+10P	- 2L	- 2P	-10P	- 4P	- 1I	x
Heat treated to 300 Brinell	0	0	- 2L	+ 4P	+ 8P	- 2P	0	-10P	- 4P	0	x
Heat treated to 400 Brinell	0	0	- 4L	+ 2P	+ 3P	- 2P	0	-10P	- 4P	?	x
QUENCH CRACKS, SUSCEPTIBILITY											
Oil quenched	0	- 1P	- 4P	- 2P	0	0	- 2P	0	- 2P	- 1N	0
Water quenched	0	- 4P	- 7L	- 7P	0	- 2P	- 6S	- 7L	- 5S	- 2N	- 2P
STRENGTH											
As rolled, as forged or normalized	+ 4P	+10P	+ 5P	+ 1P	- 2P	+ 7P	+ 5P	+ 5P	+ 5P	0	+ 1P
TOUGHNESS											
As rolled or as forged	- 3P	- 8P	+ 2N	- 8P	- 6P	- 2P	- 6P	+10P	+ 3S	+ 2P	+ 1L
Normalized	- 2P	- 6P	+ 3N	- 6P	- 4P	- 2L	- 6P	+10S	+ 5P	+ 5S	+ 2P
Heat treated to 300 Brinell	0	- 1P	0	- 5P	- 3P	0	0	+ 6P	+ 2S	+ 1P	xx
Heat treated to 400 Brinell	0	- 2P	0	- 6P	- 3P	0	0	+ 7P	+ 4S	+ 2S	xx
Fully hardened, 300 to 400 deg. F. draw	0	- 8P	- 4L	-10P	- 5P	+ 2L	- 8P	-10S	+ 4S	+ 3S	xx
Fully hardened, 400 to 500 deg. F. draw	0	- 2P	- 4P	- 4P	0	0	- 5P	- 2N	0	0	?
Low temperatures; as rolled, as forged	- 3P	-10P	+ 2N	-10S	- 6P	- 1P	-10P	+10S	+ 3S	+ 3P	xx
Low temperatures; normalized	- 3P	-10P	+ 2N	- 8P	- 4P	- 1L	- 8P	+10S	- 5S	+ 5P	xx
Low temp.; heat treated to 300 Brinell	0	- 2P	0	- 5P	- 3P	0	0	+10P	+ 2S	+ 1P	xx
Low temp.; heat treated to 400 Brinell	0	- 5P	0	- 7P	- 4P	+ 2P	0	+10S	+ 4S	- 2S	xx
Low temp.; fully hardened, 300 to 400 deg. F. draw	0	-10P	- 8L	-10P	- 6P	+ 2L	-10P	+10S	- 4S	- 4S	xx
WEAR RESISTANCE											
Fully hardened, 300 to 400 deg. F. draw	0	+10P	+ 6P	+ 1P	0	+ 2P	+ 8P	+ 3L	+ 5P	+ 2P	xx
WELDING											
Ruptures, no preheating or post heating	- 2L	-10P	-10L	- 7L	- 3P	- 5L	-10L	-10L	-10L	+ 1P	- 4L

TABLE II
Sum of all Favorable and Unfavorable Merit Rating Values for Each Element, Including all Properties or Responses Involved in a Hypothetical Set of Conditions

Fabrication, forging	+ 2P	- 7P	+ 7S	0	-10S	- 5P	0	- 6P	- 3P	0	-10S
Annealing for pearlite	+ 3L	+ 5P	- 2L	0	0	- 2P	+ 3P	- 5P	- 3L	+ 2P	x
Machinability, annealed to pearlite	+ 2P	+ 3N	- 2L	+ 6P	+10P	- 2L	- 2P	-10P	- 4P	+ 1P	- 3P
Distortion, oil quench	- 1P	- 2P	- 4P	- 3P	0	- 1P	- 4P	- 2P	- 3P	- 1N	0
Hardenability	+ 1P	+ 2P	+10P	+ 3P	- 2P	+ 2S	+ 7P	+10L	+ 7S	+ 5N	xx
Toughness, fully hardened	0	- 8P	- 4L	-10P	- 5P	+ 2L	- 8P	-10S	+ 4S	+ 3S	xx
Wear, fully hardened	0	+10P	+ 6P	+ 1P	0	+ 2P	+ 8P	+ 3L	+ 5P	+ 2P	xx
Totals, plus	+ 8	+20	+23	+10	+10	+ 6	+18	+23	+16	+13	0
Totals, minus	- 1	-17	-12	-13	-17	-10	-14	-23	-13	- 1	-13

TABLE III

Abrasion	+ 3L	+10P	+ 8L	0	0	+ 2P	+ 7P	+ 3P	+ 4P	0	+ 1P
Strength, as rolled or as forged	+ 4P	+10P	+ 5P	+ 5P	- 2P	+ 7P	+ 5P	+ 5P	+ 5P	0	+ 1P
Toughness, as rolled	- 3P	- 8P	+ 2N	- 8P	- 6P	- 2P	- 8P	+10P	+ 3S	+ 2P	+ 1L
Fabrication, bending	- 2L	-10P	+ 2N	-10L	- 7P	- 6P	-10P	+ 5S	+ 3S	+ 3P	+ 2P
Welding	- 2L	-10P	-10L	- 7L	- 3P	- 5L	-10L	-10L	-10L	+ 1P	- 4L
Totals, plus	+ 7	+20	+17	+ 5	+ 0	+ 9	+12	+23	+15	+ 6	+ 5
Totals, minus	- 7	-28	-10	-25	-18	-13	-28	-10	-10	0	- 4
x—probably negative xx—probably positive											

Gas Welding of Cast Iron

° ° °

FUSION welding of cast iron, using cast iron instead of bronze rod, is particularly interesting today because of the scarcity of the non-ferrous rod. The fusion process is also more satisfactory from the color standpoint as well as in resistance to high temperatures such as those encountered in welding damaged stove parts. Because few operators have any experience in welding this metal by the fusion process it will be necessary to train them in its general principles and to point out the difficulties they may encounter.

Successful gas welding of cast iron demands the ability to identify the type of iron in the part to be welded so that it may be properly heated and cooled to maintain those properties after welding. Thus the heat treatment used in producing malleable cast iron precludes the possibility of fusion welding, but the white, gray and chilled gray irons can be successfully welded by this process.

Welding Characteristics

White Cast Iron must be preheated all over to a temperature of from 600 to 1300 deg. F., depending upon the size and shape of the casting and the location of the break. If the weld is so located that there is freedom for expansion and contraction, the lower preheating temperature will usually be sufficient; otherwise, higher tem-

peratures must be used. Care must be taken not to overheat when preheating in the higher range, or the parts may sag or warp. A welding rod and a flux made specifically for welding cast iron should be used. Oxweld No. 9 cast iron welding rod and Oxweld Ferro flux meet these requirements. In order to provide hardness after welding, the work should be heated after the weld is completed to a uniform temperature of about 1600 deg. F. throughout and then allowed to cool rapidly in the open air, making sure there are no direct drafts on it. Care must be exercised to prevent thin parts from cooling more rapidly than heavy parts or the non-uniform contraction may cause the light or thin parts to crack.

Gray Cast Iron welding follows the same procedures as the welding of white cast iron except that local preheating may be employed if the part to be welded is sufficiently isolated from the main part of the casting to permit free expansion and contraction. After the weld is completed, the casting should be reheated to an average temperature of 1300 deg. F. (a visible red) and then annealed by allowing it to cool slowly in a confined atmosphere. Burying it in asbestos, lime or dry sand will greatly reduce the cooling rate and insure uniform cooling. If the casting is too heavy to place in an annealing bin, the preheating oven should be made as airtight as possible and used as the annealing bin.

Alloy Cast Irons should be preheated the same as other castings. After welding, they require anneal-

ing or special heat-treatment to re-establish their special physical properties. Alloy welding rod should be used but need not be of the same composition as the casting.

Poisoned Cast Iron. Castings that are impregnated with foreign substances, such as oil and brine or salt water, are said to be "poisoned," and are difficult to weld. Heating will sometimes partially remove oil by vaporization, but there is not much that can be done about salt water or brine.

Control of Molten Metal

Control of the molten metal is particularly important in cast iron welding, because molten cast iron is extremely fluid and tends to remain fluid for a long time. It will therefore easily get out of control unless the operator is careful. He may practice control of molten metal by welding together two short pieces of scrap cast iron welding rod, or two comparable pieces from a scrap casting. The pieces should be placed on the welding table parallel to and touching each other. The welding head should be one size larger than would be used for steel and the flame should be adjusted to neutral. To tack weld the rods in position the operator may play the tip of the inner cone of the flame in the valley between the rod until a small spot of the metal melts and the two fuse together. A third rod, to be used as the filler, should be heated and dipped in a can of flux, some of which will adhere to the hot rod.

The end of the pieces to be welded should be heated for an inch or

two, letting the tip of the inner cone just touch the metal and moving it in a circular motion so that both sides will be heated evenly. As the metal gets hot, the circles are gradually narrowed to an area less than $\frac{1}{2}$ in. in diameter over the tackweld and at the same time the flux-coated rod is introduced into the outer flame. The rod is slowly brought closer and closer to the inner cone, timing the movements so that the welding rod and the base metal on both sides will reach the melting point at the same time. Just as the metal is ready to melt, it will become soft and have the appearance of being wet. When this point is reached, the welding rod is lowered into the melted base metal and about $\frac{1}{4}$ -in. of it melted off into the puddle. The operator then withdraws the rod slightly and continues the circular motion of the flame, playing it on the weld metal and the base metal until they are thoroughly fused, and also playing it on the base metal ahead of the weld, thus preparing it for the next addition of rod. This alternate adding of rod and fusion of the metal should be done with a rhythmic timing of about 30 sec. for a complete cycle.

Precautions

The molten puddle should not be stirred with the welding rod and the latter should not be melted off and permitted to drip into the weld drop by drop; otherwise, the oxide that always forms on the surface of molten iron will be carried deep into the weld and the flux cannot float it out. If it is not floated to the surface, the strength of the weld will be greatly reduced. The correct practice is to touch the end of the rod to the molten base metal and melt it off. If rod metal is added before the base metal is melted, the two will not fuse but will merely adhere without bonding together. When white specks are noticed on the surface of the molten metal or within it, flux must be added to the weld by again dipping the hot rod in the flux can. These specks are oxides and if permitted to remain in the weld will form hard spots. They can be removed by dipping the tip of the inner cone of the flame into the molten puddle and manipulating the flame and rod until the specks are brought to the surface. Gas bubbles should be similarly removed to free the weld of blowholes and gas pockets.

Once the weld is started it should be carried through to completion

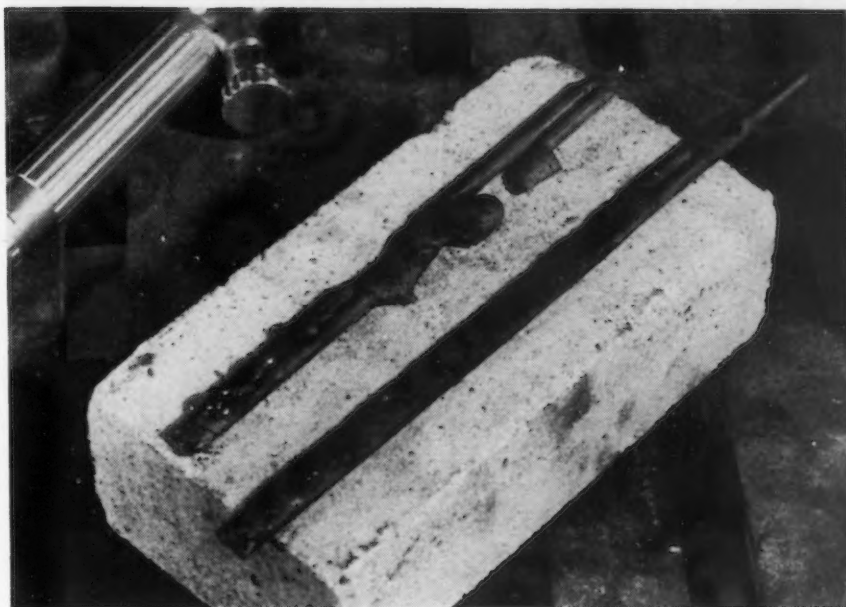


FIG. 1—Good and bad fusion welds. The base metal in the weld at the left was not hot enough for the first few inches; then it was heated too much and melted through.

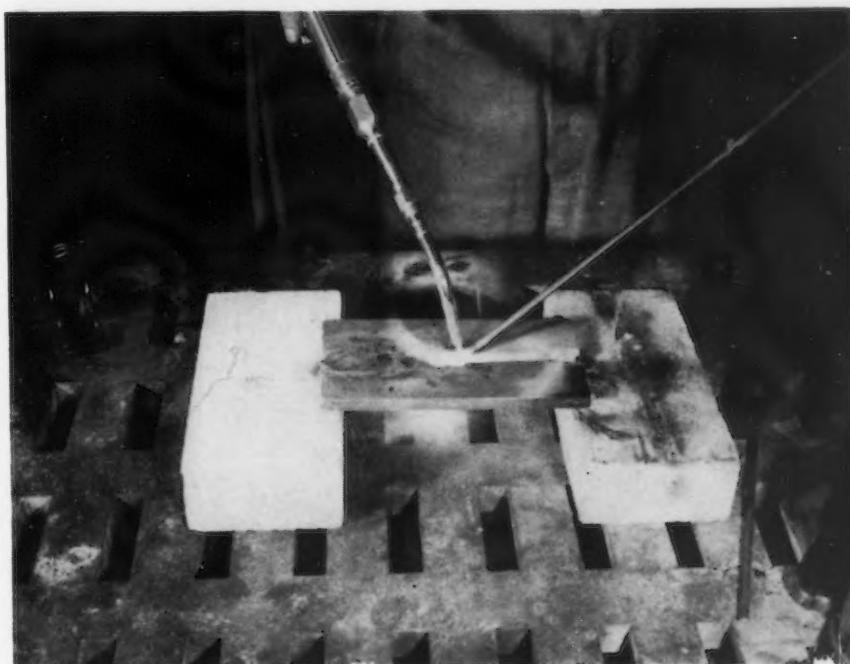
as soon as possible. As mentioned above, if the weld metal is added to relatively cool base metal an adhesion will result. On the other hand, if the flame is held in one spot too long, the puddle will become too large and the operator will lose control of it.

The weld at the right in Fig. 1 is obviously a good one, but the one at the left shows the difficulties that were experienced by a beginner.

For the first three or four in. he did not have the base metal hot enough, and then for the next two or three in. he had it too hot. Finally, he heated the base metal unevenly, melting it on one side but not on the other.

Fig. 2 shows the welding of pieces about $\frac{3}{8}$ x 2 x 8 in. in size. They are prepared by grinding on a wheel to a 45 deg. angle so as to form a 90 deg. V when placed to-

FIG. 2—Practice welding of cast iron. Supporting pieces between two bricks will help develop the operator's skill because he can see when the metal becomes too hot and flows through the V.



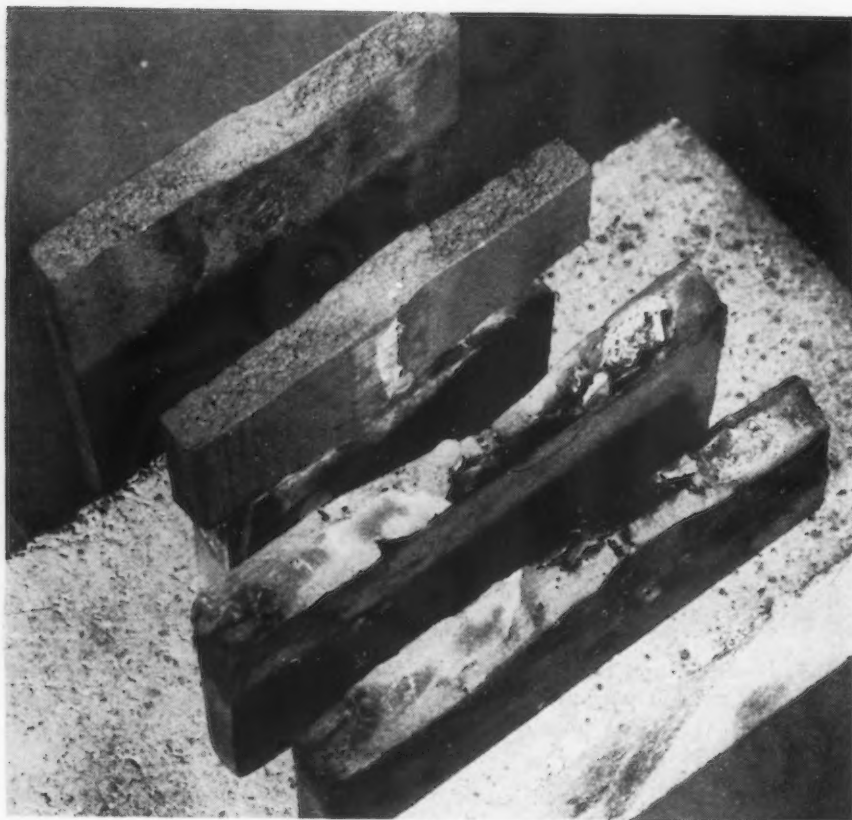


FIG. 3—Fractured welds show good and bad practice. All photographs courtesy Linde Air Products Co.

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FIG. 4—Bricks (arrows) under corners permit preheating the casting from underneath prior to gas welding.



gether. They should not be ground to a knife edge. Leaving a blunt bevel with about $\frac{1}{8}$ in. at the bottom will aid alinement and make it easier to control the molten metal.

After tack welding the pieces are heated with the blowpipe to about 300 deg F. Higher temperatures are unnecessary since the parts are small and free to move with expansion and contraction. The heating area is then gradually confined to the end of the V where the welding is to begin and the metal brought to a molten state at this point with a rotary motion of the flame for a distance of about an inch along the bottom of the V so the metal flows down and fuses with that at the bottom. No welding rod is used up to this point, and withdrawal of the flame can be used to check any tendency of the metal to run out the bottom. Just as soon as the metal at the bottom of the V is fused together, the addition of metal from a flux-dipped rod can be started. The V should be filled and built up slightly higher than the top of this inch-long heated section.

When finishing up the weld, the operator should make sure that the weld metal and the base metal are thoroughly fused at the edges of the puddle, where a crust of slag is likely to be formed, by playing the flame around the edge three or four times. As one section of the weld is completed the operation should begin over again by melting down the bottom of the V for an inch or so further on, and filling it up as before.

The broken specimen in the foreground of Fig. 3 shows the results of failure to obtain thorough fusion or complete penetration, while that in the background was a good weld.

Heavier Castings

A typical cast iron welding job on a machine part is illustrated in Fig. 4. This casting, a broken gear case about $2\frac{1}{2}$ ft. long, was cracked upward from the opening. The Y-shaped crack extended on either side of the boss at the top. Because of the size of the casting and because the crack was so located that the parts were not free to move, it was necessary to preheat this casting all over to a moderate temperature of 500 or 600 deg. F. A temporary preheating furnace was built of firebrick, and charcoal was used for fuel. Charcoal burns slowly and evenly, is economical and is available almost everywhere.

Sometimes, however, city gas or fuel oil are used because of their ease of regulation and manipulation.

Preheating Furnace

The bricks for the furnace floor were laid down directly on the cement floor of the welding shop and a couple of shovelfuls of dry sand spread over them to fill up the cracks. The floor of the furnace was made sufficiently large to accommodate the casting easily, with plenty of space on all sides for the charcoal. The walls were built up one course of bricks higher than the height of the casting. This was done because it was necessary to place a half brick under each corner of the forward end of the casting (Fig. 4) to elevate it so that the far end of the crack where the weld was to start would be in a horizontal position. These foundation bricks also permitted preheating the casting from underneath.

A space of about 1 in. was left between each brick in the lower course of the wall to permit air to enter the furnace to burn the charcoal. In larger furnaces, air ports should be provided between the bricks of two of the lower courses.

A brick, standing on end, was placed near each port to serve as a damper as shown in Fig. 6. These dampers were left open while the casting was being preheated and also during the welding operation, but were closed after the weld was completed and the casting permitted to cool.

Finally the furnace was completed by placing two bricks on edge on the top of the wall, with a length of $\frac{1}{4}$ -in. steel welding rod across them. This arrangement was to serve as a support for the asbestos paper roof and left space for burnt gases to escape.

The Charcoal Fire

The casting was prepared for welding by chipping out the crack with a hammer and chisel to form a 90-deg. V. The V was extended for about $\frac{1}{4}$ in. beyond the ends of the crack. The casting was then temporarily placed in the furnace to determine the exact location of the foundation bricks, after which it was removed, the entire bottom of the furnace covered with charcoal, and the casting again replaced in welding position as shown in Fig. 4. More charcoal was then strewn loosely all about the sides and ends of the casting. A total of about $1\frac{1}{2}$



FIG. 5—Folded asbestos paper on top of the furnace helps to protect the operator's hands from the heat from the charcoal fire.

bags, or 7 lb., was used. Beginners are usually inclined to use too much charcoal with the result that the casting becomes overheated, particularly at the bottom, causing it to sag or warp out of shape, if it does not collapse altogether.

The charcoal was ignited by playing the flame of the blowpipe over it and then whipped up by a blast from a compressed-air hose. When the charcoal began to glow lustily,

the entire top of the furnace was covered over with a sheet of asbestos paper.

After the fire had burned for about an hour, the temperature of the casting was tested. A flap-like break (Fig. 5) was made in the asbestos paper. To test the temperature, a small lead button was placed on the casting near the V. When the button melted slowly, it indicated the casting had reached

FIG. 6—As soon as the weld is completed the furnace is made as airtight as possible by sealing up the ports to permit slow cooling of the casting.



a temperature of about 600 deg. F. which was the degree of heat desired.

The two flue bricks on top of the wall were then removed to lower the asbestos paper so that the break in the casting would be more accessible. The paper was supported by two steel welding rods across the top of the wall to prevent its collapse. Welding was started at the far end of the left-hand branch of the Y-shaped crack, using an Oxyweld W-17 blowpipe with a No. 15 head. A piece of asbestos paper loosely folded three or four times was placed on the edge of the furnace under the blowpipe to protect the operator from the heat. The general area of the weld was further preheated with the blowpipe before the actual melting down of the first section of the bottom and sides of the V began.

After this branch of the Y was welded, a new weld was started at the far end of the other branch and carried down to its juncture with the first weld. The foundation bricks under the front end of the casting were then turned on edge to elevate it further so that the tail of the Y could be welded in a flat position.

As soon as the weld was completed, the asbestos flap was closed,

Percentage of Alloying Elements in Various Cast Irons

Plain Cast Iron		Total Carbon	Silicon	Manganese	Sulphur	Phosphorus
Gears	Light	3.75	2.50	0.70	0.08	0.80
Machinery castings	Light	3.75	2.50	0.60	0.08	0.70
	Medium	3.50	2.00	0.80	0.09	0.60
Water Pipe	Light	3.75	2.25	0.60	0.06	0.80
	Medium	3.50	2.00	0.80	0.08	0.70
Steam cylinders	Light	3.50	2.00	0.80	0.09	0.50
	Medium	3.50	1.60	0.60	0.08	0.40
Steam radiators	—	3.50	2.25	0.70	0.06	0.80
Agricultural castings	—	3.50	2.25	0.60	0.06	0.70
		to	to	to	to	to
		3.75	2.50	0.70	0.08	0.75
Railroad car wheels	—	3.84	0.69	0.12	0.12	0.43

Alloy Cast Iron (Sulphur and phosphorus not included)		Total Carbon	Silicon	Man-ganese	Chro-mium	Nickel	Copper	Molyb-denium
Special motor blocks		3.00	1.75	—	0.50	2.00	—	—
Alloy iron die pots		3.40	1.60	0.60	1.10	2.20	—	—
Nickel and molybdenum crankshafts		2.85	2.00	0.95	—	1.00	—	0.60
High alloy corrosion-resistant cast iron		3.15	1.00	1.00	1.75	13.50	5.50	—
			to	to	to	to	to	—
			2.50	1.50	2.50	17.50	7.50	—

the folded asbestos paper heat shield placed over it, and the damper bricks placed in front of the air ports (Fig. 6). The fire was then left to burn itself out, and the casting was not disturbed until it was completely cold the next day.

If a casting is too large to be moved to the welding shop, the pre-heating furnace is often built around it. A furnace containing

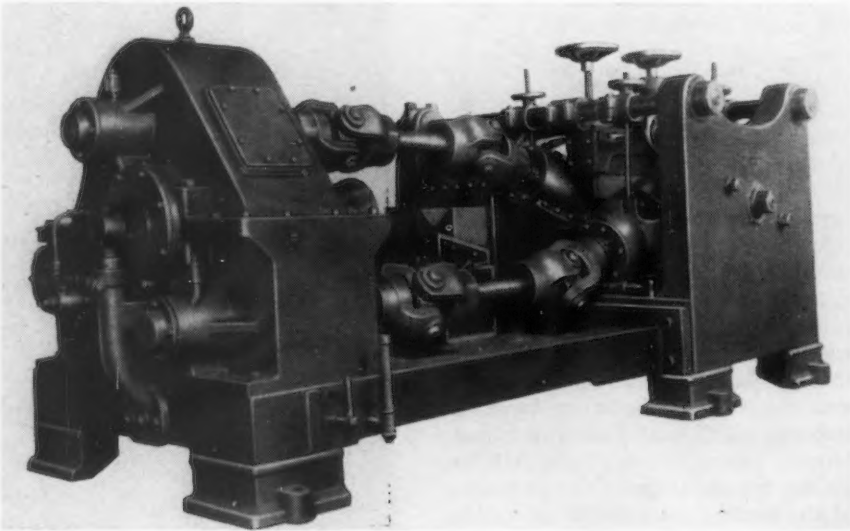
1700 bricks, for example, was built around a 16-ton cast iron melting pot at a lead mine. Ten cracks in the 12-ft. diameter pot totaled 22 ft. in length and required 249 lb. of welding rod and 38 lb. of flux. It took two operators, both welding at the same time, 20 hr. to complete the job. Twenty-six of these pots were reclaimed at one mine and 19 at another.

Bar and Tube Straightener

RECENT improvements in Medart bar and tube straighteners include a wider angularity of roll adjustment to permit a greater variety of work operations, ranging from high speed straightening to more exacting operations of sizing and polishing all types and conditions of bars. Universal joints are now Timken bearing equipped and rolls are of highly polished forged tool steel. The former features of continuous end-to-end feeding and instant reversal of workpiece direction are retained. In these machines, the bar or tube is straightened by passing it between two rolls set at an angle to each other and between a top and bottom guide. One of the rolls is concave (actually a developed hyperboloid) and the other is straight. The latter deflects the bar against the former so that it is subject to a large number of

straightening cycles per foot of bar length. Angularity of the rolls is adjusted by means of independent handwheels. The Medart

Co., St. Louis, now builds these machines in eight sizes for bars and tubes from 1/16 to 9 in. in diameter.



The Röchling Wide Strip Mill

EFFORTS to modify general American technique in the operation of continuous wide strip mills to suit European conditions are described herein. Röchling some years ago made a license agreement with Cold Metal Process Co., and engineers of Röchling and Krupp were assisted by A. B. Montgomery, of the Youngstown company, in incorporating Steckel designs in this installation.

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DEALING with the development of the wide strip mill on the Broemel and Steckel patents by the Röchling concern, in Report No. 169 of the Rolling Mill Committee of the Verein deutscher Eisenhüttenleute (Stahl und Eisen, Feb. 5, 1942), D. Timmermann considers that the continuous wide-strip mill as evolved in the United States is not suitable for European conditions, as the American mills entail a high capital expenditure and must be operated at high outputs to be at all economic. Various attempts have been made in Europe to devise some economic modification of continuous rolling, such as joining strip from standard medium sheet mills by welding and intermediate heating of the strip to enable the whole sequence of rolling operations to be carried out in quick succession, down to the final thickness required. The disadvantages of this method include welding difficulties and fluctuating thickness of individual sections.

Proposals have also been made to hold the strip after each pass in a heated coiler, so that the material is maintained at a sufficient temperature and is not excessively cooled between the first and last stands. E. Broemel has been responsible for a number of patents on these lines. In his original specification of 1927, the strip passed through six stands and was taken up by one of a pair of hot coilers on a track perpendicular to the direction of rolling. When the whole strip has been coiled, the coiler is moved laterally to line up

with a seventh stand on the other side of which is another hot coiler; the strip is then passed to and fro through stand 7 between the hot coilers until rolled down to the required gage. The second of the two hot coilers behind stand 6 receives a second strip and takes it for final passes to stand 8 and a fourth hot coiler on the opposite side of the main rolling line.

To avoid the reversing stands required for the final passes in this layout, Broemel proposed placing a hot coiler between each pair of stands, the strip being coiled after each intermediate pass, the direction of rotation of the coiler then being reversed to feed the strip to the next stand; meanwhile the strip is maintained at temperature in the coiler or any heat losses made up. This arrangement now goes by the name of the Röchling rolling or strip mill in Germany. Rolling is thus in stages and not strictly continuous, and with a four-stand mill two strips, but not more, can be handled simultaneously. In consequence, the speeds of the individual stands are independent of each other.

To test the practical possibilities of this arrangement, and especially of the hot coilers, an experimental plant was built at Völklingen; results therewith were so satisfactory it was decided to erect a plant for handling strip up to 40 in. in width. This unit consists of a standard roughing train, followed by four three-high stands, a hot coiler being placed between each pair of stands. The stands were originally three-high, but provision was made for their conversion to four-high, as well for the addition of two further stands with hot coilers. The rolls on the finishing stands have barrels 37, 17 and 37 in. in diameter and 47 in. long. The design and operation of the stands present no unusual features, beyond the use of plastic bearings for the rolls, which have, it is claimed, proved quite satisfactory even with the thinnest strip.

The strip is coiled on a heat-resisting drum driven by friction rollers, being then directed by a system of guide rollers and fingers. No speed control on the drive is provided, as this is considered un-

necessary. Each coiler is heated by gas to a temperature between 1470 and 1650 deg. F., which has been found to give good thermal distribution throughout the strip.

The results obtained with this mill, when equipped with only two stands and one hot coiler, came up to expectations, and it was then decided to convert two further trains to the same system; but the outbreak of the war interrupted these plans. With the removal of the Saar from the scene of operations, it was later planned to build an entirely new plant for still wider strip; work on this plant has already begun. No further details of the plant are given, but the author goes on to sketch the principal features of a Röchling strip mill for material up to 60 in. wide, together with a layout, suggesting that considerable progress has been made with the new plant at some undisclosed location. From an analysis of the times taken by each operation in the plant sketched, it seems that, making allowance for pauses, the capacity of such a mill is between 20 and 25 slabs per hr., corresponding to between 50 and 70 tons of strip per hr., according to final width and gage of strip.

In principle, the Röchling mill is a semi-continuous mill, although the hot coilers introduce fundamental changes in general layout as against the ordinary semi-continuous mill. Comparing this method of strip rolling with the true continuous mill, the report claims a number of advantages, mainly concerned with the maintenance of a more uniform temperature throughout the rolling program, the greater ease in removing scale as the strip is subject to several reversals of bending, and the fact that speed control does not require such accurate synchronization. In the continuous mill, the strip must leave the last stand at 27 to 34 ft. per sec. to make allowance for the reduction in thickness and increase in length starting with a feed rate at the first of a six-stand train of 3 to 5 ft. per sec. This slow rate results in uneven cooling between the two ends of the strip. In the Röchling mill, rolling speeds are quite inde-

(CONTINUED ON PAGE 124)

Foreign Solutions for Scrap Deficiencies

By H. COWES

*Det Norske Aktieselskal for
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U. S. A. Branch, New York*

... Many foreign countries long ago encountered the scrap shortages that are currently creating difficulties in the U. S. Here is how they attacked the problem. Sponge iron processes were examined intensively, but with little success. The RK process shows more promise, with five or more plants operating. Conventional blast furnaces, however, remain the preferred smelting equipment.

WHAT with extremely extended demand for iron and steel to supply the expanded war and defense industries, a shortage of scrap has developed in most of the countries of the world. The normal flow of ferrous materials has been interrupted, the scrap rapidly being absorbed in war machinery and construction of different kinds without ever appearing again in the normal circulation. Also, the hesitation of scrapping construction which normally was on the schedule is explainable because of the difficulty of replacement. It is obvious that the large steel producing countries whose output of construction steel was mainly based on converting scrap in large furnace units have been hardest hit by the scrap problem. And, of course, smaller countries, who for their construction steel were dependent on imports from larger producing countries, have been affected by the general scrap shortage.

The U. S. has become accustomed to depending on scrap as a most important raw material for the ferrous industries, and methods of production have been in accordance with this. The current decreasing supply brings about a raw material problem of the greatest importance, and the success of solving this problem will be judged more from the

standpoint of speed and quantity than from cost. Even if all the world completely taps its scrap sources, industry will some day have to turn more and more to natural ore resources. The country is now arriving at conditions similar to those prevailing in earlier days of the iron industry; that is, a smaller percentage of iron and steel will be made from scrap and larger percentages will have to be extracted from natural mineral resources.

Facing such serious conditions in steel production, the various countries of the world have tried to solve the problem in different ways and in accordance with prevailing domestic conditions. How they have solved this problem of maintaining and increasing their iron and steel output will, of course, not be fully known until after the war, and the disclosures will certainly be of great interest and probably will involve some surprises.

Scrap has to be replaced by some kind of iron carrying ore. In case of limited normal resources, new sources have to be found. For example, where in former times residue from roasted sulphuric ores was considered unsuitable, today these residues will in some countries be the main source of iron. Limonites have been considered as

a very inferior ore; whereas, they now play an important role. In countries where ores containing 35 per cent iron are mined it would not be believed that other countries until recently considered magnetite ores of secondary quality.

The means of extracting the iron from the ores in the simplest way and shortest time has certainly been subject to the most intense studies all over the world. If a guess should be made as to which method has been considered as "number one," it would safely be the old-fashioned way of blast furnaces or similar pig iron producing methods. It may be true, however, that important changes have been made for increasing their output or enabling them to digest other kinds of ore formerly considered unsuitable. In countries having an abundance of electric power the electric processing of ores has been given much consideration. Some of the reasons for this may be that electric smelting is less sensitive to quality of ore and reducing agent; installation costs are lower; the time for erection is shorter, and installation in successive units and decentralization are possible.

However, the processing of iron ores into pig iron necessitates many new installations, as it certainly would not be possible to increase the output of available units in an amount which could even nearly offset the lack of scrap. Moreover, the pig iron has to be converted into steel, which also involves new additions to the steel plants, as the output of available steel units should not be decreased considerably. A process will have to be chosen for converting the pig iron that involves the least equipment and that takes the shortest possible time for building. The common ways are the open hearth,

(CONTINUED ON PAGE 130)

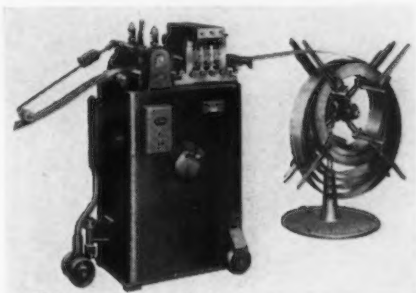
New Equipment . . .

Presses and Press Room Accessories

For today's production problems there are scores of new and improved hydraulic, pneumatic, and mechanical presses with accessories and attachments for faster and more efficient output.

EIGHT sizes of presses with multiple dial feeds are now being built by the *Federal Press Co.*, Elkhart, Ind. All moving parts of the dial feed are enclosed, with the exception of the dial plate itself, and indexing is obtained positively by a cam and gear arrangement in connection with the crankshaft. This action is said to smooth out the indexing motion to facilitate speed. Features of the multiple dial feed press include a manufacturer's check of six points

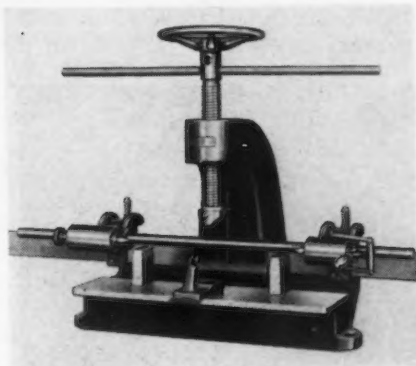
machine is portable, and is fitted with a control arm to regulate the loop of stock between feed and



press. Either a 5- or 7-roll straightener can be used, depending on the stock. Maximum stock width is 8 in., and feed is 10 to 60 ft. per min.

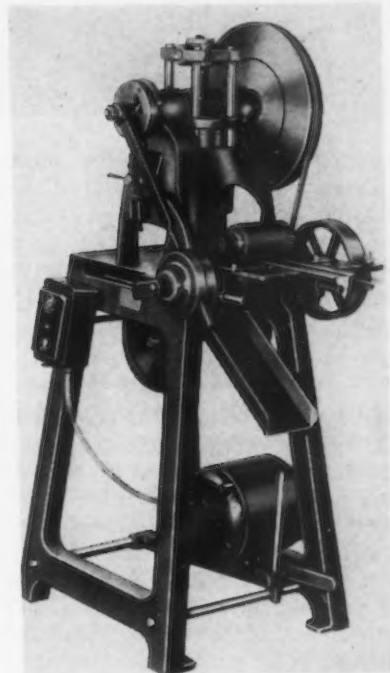
Hand Straightening Press

FOR the heat treating shop of the tool room, a hand-operated straightening press is offered by the *General Mfg. Co.*, Detroit. Tools designed for particular jobs include bending block carriers, shaft straightening carriers and roller V-type straightening attachments. Standard table size is 30 x 8 in.; stroke is 9 in. and throat



depth is 5 in. The press alone, without attachments, weighs 470 lb. It uses a 2 $\frac{3}{8}$ -in. diameter 3 pitch Acme screw thread.

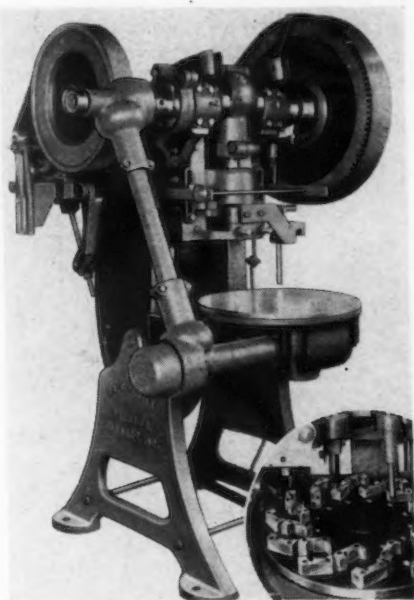
THREE operating speeds up to 500 strokes a minute are obtainable on a new high speed stamping press built by the *Di Machine Corp.*, Division of *Diebel Die & Mfg. Co.*, 3654 Lincoln Avenue, Chicago. It is claimed that



one unskilled man or woman can operate a battery of these units because of their simple design. Built-in feeding mechanism handles strip or coil stock for the automatic production of metal, fiber and plastic stampings.

Punch and Die Holder

THE latest addition to the Wales line of punching and notching equipment is a punch and die holder capable of punching three holes per holder. The new device punches holes for riveting small parts to flat or channeled material, and the holes can be punched in a straight line or at any angle,



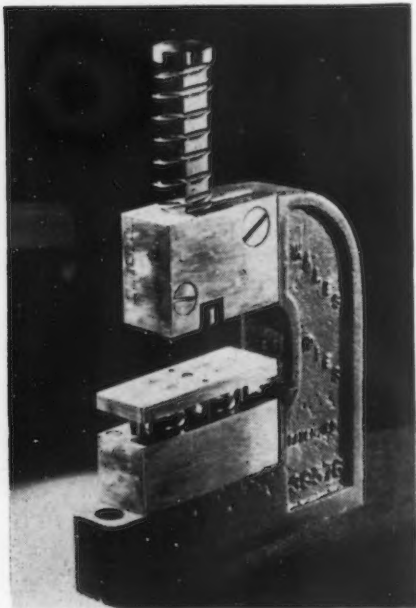
on the press to assure a tolerance of 0.0015 in.; boring of the ram in alignment with the long V-ways; and a safety interlock which permits setting or adjustment of dies while the flywheel is in operation.

Feeding and Straightening Machine

ANEW style feeding and straightening machine is announced by the *F. J. Littell Machine Co.*, 4151 Ravenswood Avenue, Chicago. Mounted on an enclosed fabricated steel base, the

NEW EQUIPMENT

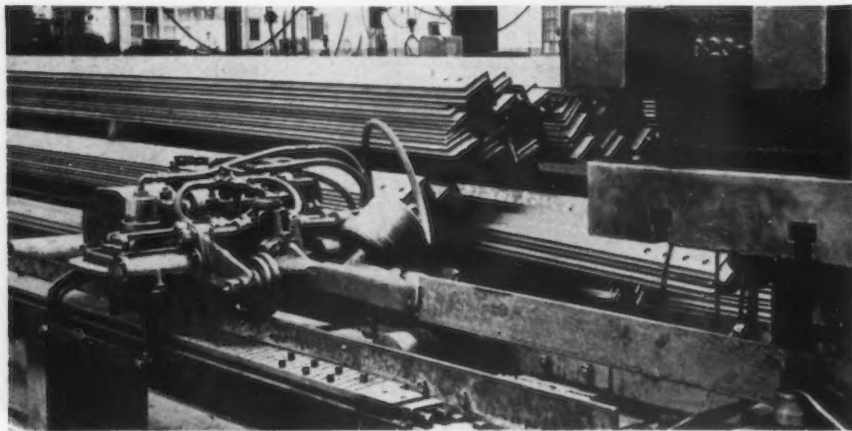
according to the set-up of the holders. Both punch and die are built into a single unit, hence nothing need be attached to the press ram.



Strippit Corp., Buffalo, the manufacturer, has also developed the NAROPUNCH, a compact holder capable of punching 3/16-in. maximum diameter holes on a minimum center to center distance of 5/8 in., with a shut height of 6 1/4 in.

Punch Press Feed Spacer

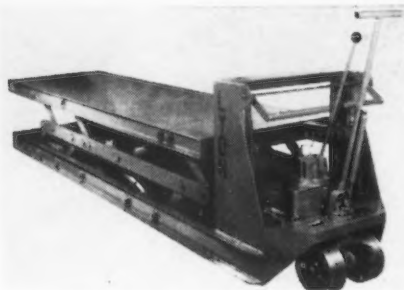
TEMPLATE-MAKING and layout of strip and structurals can often be eliminated by the use of a new automatic machine developed by Pollasky Engineering Co., Milwaukee. The machine consists of a carriage which grips the metal to be punched and feeds it either into or out of the press. Location of holes is set up by inserting template pins into holes in the template table at 1/16-in. spacings. A single operator controls the unit, which



can be attached to any punch press. Compressed air is the motive power of the machine, which will feed approximately 60 ft. per min. and permit punching of 10,000 holes a day on long work where holes are closely spaced.

Press Feed Elevator

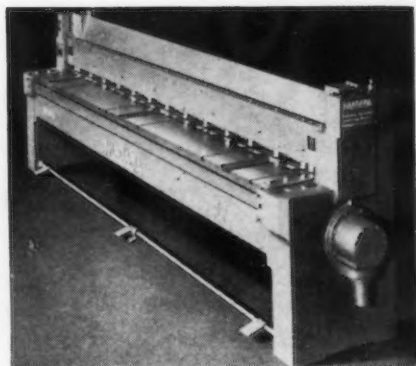
A HAND-OPERATED hydraulic truck for handling long strips of sheet metal is a new product of the Lyon-Raymond Corp., Greene, N. Y. With a maximum capacity of 10,000 lb., it is particularly intended for keeping sheet metal at a convenient height for the operator while he is feeding a



press. It has a two-speed hand-operated hydraulic pump, and a floor lock to hold it in position at the press.

Power Shear

THE Niagara Machine & Tool Works, Buffalo, announce the addition of a new line of Series 3 power squaring shears, incorporating several improvements intended to increase speed and accuracy. It is said to permit the cutting of sheared edges that are straight and parallel to within a few thousandths of an inch. Equipped with a quick acting sleeve clutch and a ball bearing, self-measuring back-gage, it operates at a speed of 80



strokes per min. Drive mechanism, including clutch, flywheel, gearing, eccentrics and connections, operates in oil, and the motor is direct connected. Cutting lengths range from 4 to 12 ft., with capacities from 18 to 14 gage.

Pneumatic Die Cushion

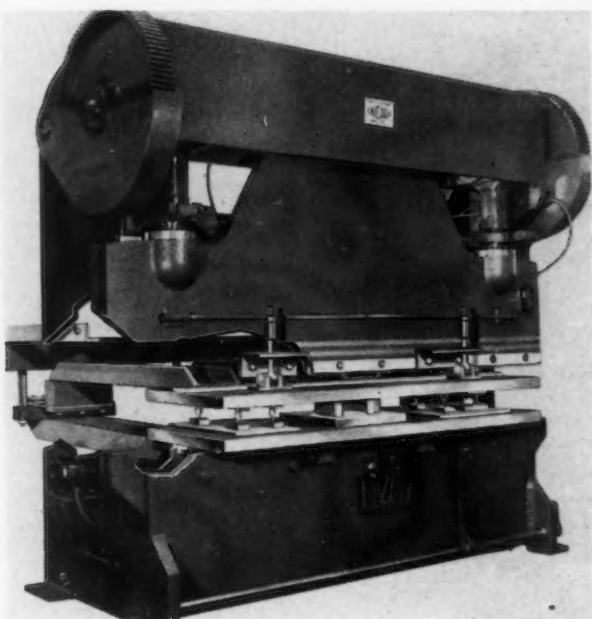
DAYTON ROGERS MFG. CO., Minneapolis, has redesigned its model DB universal die cushion, and offers it as a complete self-contained unit. Each cushion can be supplied with a special pin pressure pad to take advantage of the entire pin area available in connection with the maximum press bed opening. Sizes range from 6 to



20 in., with a maximum drawing capacity of 10 in., and with ring holding pressures up to 15 tons.

Small High Pressure Valves

SAID to overcome the tendency of high pressure hydraulic valves to "pressure lock," a new line of balanced valves is offered by Galland-Henning Mfg. Co., Milwaukee. Built in four standard sizes, 3/8, 1/2, 3/4 and 1 in., the NO-PAK valve employs only one moving part, a rotating spindle, within the valve body. Three- and four-way types are built for either pump or accumulator operation.



Press Brake Die Set

SELF-BALANCING and positive alignment are the outstanding features claimed for the new press brake die sets manufactured by *Leslie Welding Co.*, 2943 Carrol Avenue, Chicago. Most dies are interchangeable in the die set right on the press and die shoes can be made in almost any tool room from hot rolled plates. This universal die set uses no leader pins or bushings and is said to permit handling of work of almost unlimited length and throat depth.

Pneumatic Foot Pedal

TO minimize the operator fatigue caused by continual depressing of mechanical foot pedals on power presses, *A. Schrader's Son*, Brooklyn, offers a pneumatic pedal with a 1½-in. stroke under



light pressure. The Schrader pedal can be operated without lifting the foot from the floor, and it is portable to permit various angles of approach.

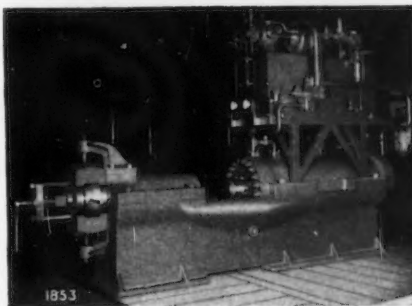
High Pressure Flow Meter

ENTIRELY neclosed, and without internal working parts, a new flow meter produced by the

Cochrane Corp., Philadelphia, is built on an adaptation of the ring balance, or tilting U-tube. The mercury sealed manometer is a 15-in. diameter stainless steel ring, balanced on knife edges at its geometric center. Its 36-in. indicating scale may be combined with an integrator and a 12-in. recording chart. Tested at 7500 lb. per sq. in., the meters are intended for working pressures in the neighborhood of 5000 lb. per sq. in.

Electrode Extruding Press

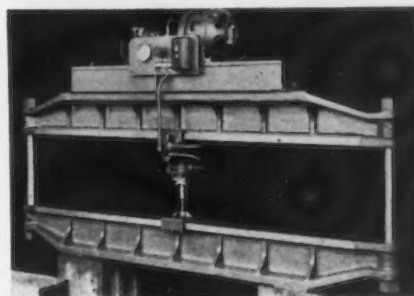
IMPROVEMENTS in the model 100 hydraulic extruding press made by *Beatty Machine & Mfg. Co.*, Hammond, Ind., make it a self-



contained unit with an integral frame, eliminating tie rods and pull back cylinders. It uses a duplex pumping unit with variable speed and pressure control, applying pressures to 10,000 lb. per sq. in. on the coating material. The material cylinder is fitted with a heat treated renewable iron liner, and the press has duplicate heads which can be alternated by removing a coupling pin. Standard material cylinders are 50 in. long, for three 16-in. slugs, but a 72-in. cylinder can be furnished.

Hydraulic Riveter

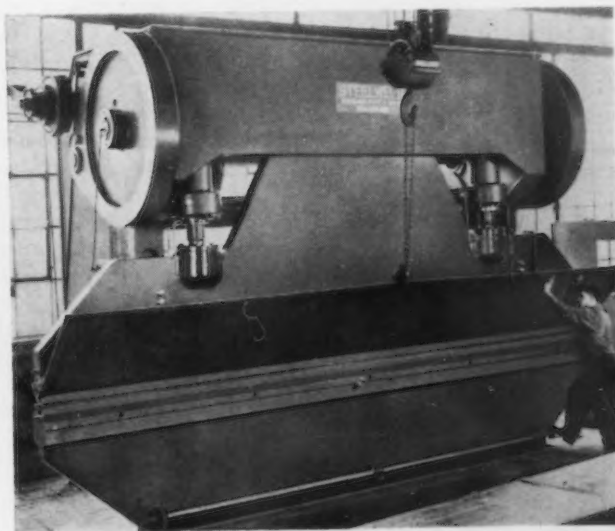
A NEW 10-ton hydraulic riveting machine having a 9 ft. 10 in. clearance between tie rods is announced by *Lake Erie Engineering Corp.*, Buffalo. The press is self-contained, with pumping unit and surge tank mounted on the top

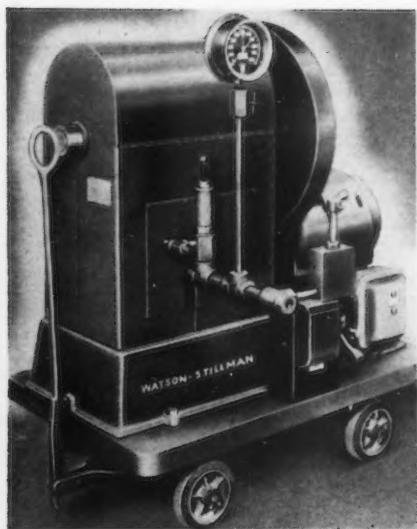


beam. A manually operated valve controls downward pressure of the 3-in. riveting stroke. The distance between beams is 21½ in.

Mechanical Bending Press

A NEW Steelweld bending press, with double bed and ram extension for forming and bending plate up to 20 ft. in width is announced by *Steelweld Machinery Division*, Cleveland Crane & Engineering Co., Wickliffe, Ohio. Plate thickness accommodated depends on width, of course, but the machine will handle 20 ft. of ½-in. thick plate. All gearing is enclosed and shafting and other machinery are located at the rear of the press. The ram is operated by two forged steel eccentrics, and the main clutch is of the multiple-disk type, easily adjustable without tools. A duplicate of this clutch is used for braking.





Portable Test Pump

FOR testing boilers, tubing and many types of high pressure vessels a new motor driven portable pump is being marketed by *Watson-Stillman Co.*, Roselle, N. J. The entire unit, including motor and controls, is mounted on a hand truck, and all parts are enclosed for protection against foundry sand and other air-borne abrasives. The 2-in. stroke, three-plunger pump is driven by a 3-hp. motor and discharges $\frac{1}{2}$ gal. per min. at a maximum pressure of 8200 lb. per sq. in. Weight of the entire unit is 1450 lb.

Hydraulic Operating Valve

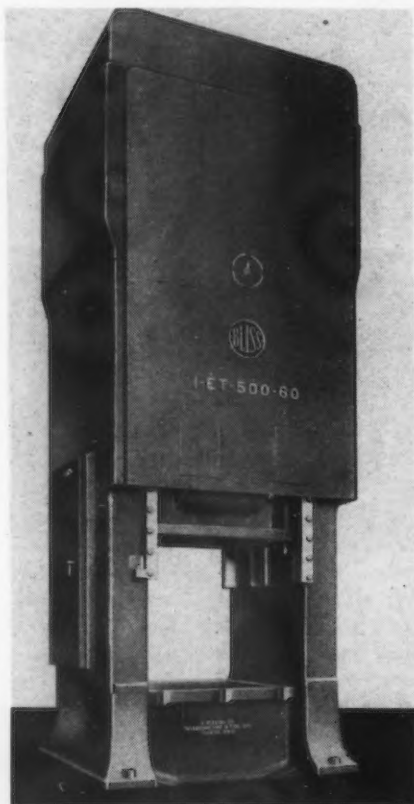
QUICK and efficient control of accumulator operated presses are said to be the particular features of a new four-way high pressure operating valve built by *Baldwin Southwark Division*, the *Baldwin Locomotive Works*. The valve has a forged steel body with alloy steel spindles and seats. Seats



are removable for regrinding or replacement. In practice, the valve is located on or near the press it supplies, while its operation is controlled by a small pilot valve.

Toggle Drawing Press

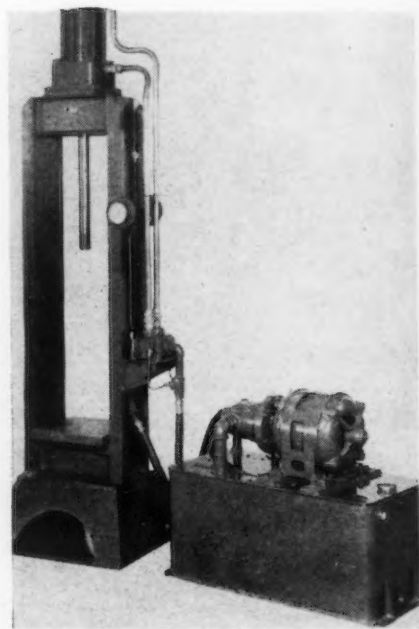
A NEW line of enclosed one-point double action toggle drawing presses has been developed by the *E. W. Bliss Co.*, Brooklyn. These single crank presses are available in a variety of standard sizes with practically any pressure capacity, stroke or die space required. The press frame is the conventional four-piece shrunk-in tie rod type. Provision can be made for disconnecting the toggle mechanism from the blank holder and attaching the outer slide to the



inner slide which is operated in the usual manner, thereby converting the press into a single acting machine. They can also be fitted with a synchronized mechanical third motion in the bed, or with die cushions in this location.

25-Ton Hydraulic Press

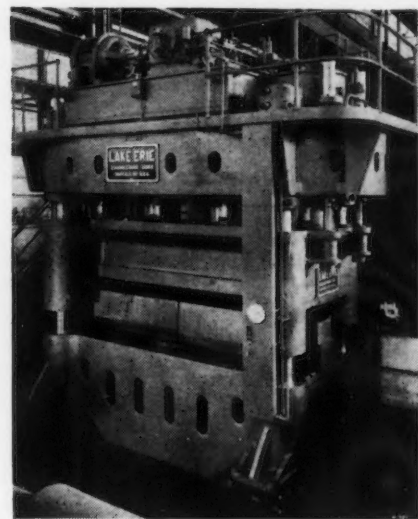
WELDED steel construction features a small hydraulic press developed by *Hydraulic Machinery, Inc.*, 10421 Grand River, Detroit. The unit is operated by a manual valve controlling a pumping unit consisting of a $7\frac{1}{2}$ hp.



motor driving a two-speed pump. Stroke is 30 in., with an approach speed of 4.4 in. per sec., and a pressing speed of 0.8 in. per sec. Return is at the rate of 5 in. per sec. Daylight is 60 in., and the platen is 18 x 18 in. square.

Plate Bending Press

LAKE ERIE ENGINEERING CORP., Buffalo, has designed and built a 3000-ton press for bending armor plate. With a bed of 168 x 53 in., a daylight and stroke of 42 in., it handles relatively large pieces. Maximum approach speed is 200 in. per min., and pressing speed is adjustable to 12 in. per min. Four large rams apply pressure over the moving platen, which is guided by hand scraped guides bearing on the columns. The entire unit is self contained, with a 150 hp. pumping unit on top.





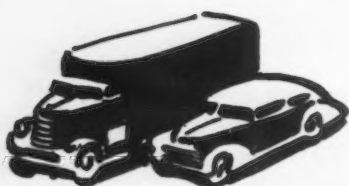
*Enlist for the duration by joining
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of the 10% Club.*

*This safe investment provides a
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*Ohio Ferro-Alloys Corporation
Canton, Ohio*

Assembly Line . . .

• Old auto bodies may be source of high-tin content solder . . . Set of drawings showing various types of bodies, and location of solder spots on each proposed for education of auto wreckers.



DETROIT—With the tin situation becoming more pressing and the tin content of solders and various white metal bearing alloys being sharply reduced by order of the Tin-Lead Division of WPB, there comes now a suggestion that old automobile bodies may be the source of high-tin content solder.

The suggestion is another one of those obvious things, but investigation fails to disclose anyone else who has thought of it or attempted to salvage this material. Certainly in the auto graveyards and scrap yards around Detroit, there is no evidence that tin is being salvaged from these auto bodies, a check-up here last week revealed.

E. T. Hopkins, of the manufacturing manager's office, Briggs Mfg. Co., advances the suggestion, with the conservative estimate that the equivalent of 1 to 10 lb. of solder can be obtained from every automobile body that is scrapped. He points out that—especially a few years ago, and prior to the use of the turrent top on automobiles—every manufacturer used at least 5 to 10 lb. of solder on every automobile body, and some types of bodies carried as high as 50 lb. of solder with them when they left the final assembly line. This solder was deposited virtually in chunks at certain specific locations on each body type. Where volume was small and the bodies were hand built, it was frequently said that some bodies

had more than 100 lb. of solder, but this cannot be verified now.

Normally, this solder was applied to only about six parts of the auto body. This is the fact that makes it relatively easy to salvage the material now. The typical locations for large quantities of solder is along the roof rail immediately above the front door of the four-door sedan and in a similar location on two-door sedans and coupes. Here it was necessary to join the roof rail with the front end stamping, or corner post, and the solder was deposited in 2 to 4 lb. chunks to smooth the joints. Another location where considerable solder was employed was at the point where the trunk deck lid hinged at the rear of the body top. Considerable solder was also used to cover up joints at the front hinge pillar (the corner post beside the windshield) and at the "dog leg" where the rear wheel housing jibed into the door opening area.

IN general, it can be said that the largest quantities of solder were used in cases where the greatest amount of hand work on the sheet metal was necessary. This prevailed wherever extremely difficult joints were made, wherever small volume production made it too difficult to procure perfect dies and when hand-finishing was required and hand-forming employed on difficult corners, etc.

The solder used by the industry

consisted generally of 30 per cent tin and 70 per cent lead, and in many cases as high as 40 per cent tin.

Hopkins' suggestion is that further investigation should be done along the following lines: there have been only half a dozen principal body builders and each of them has some record of the solder employed and the points on which it was used on the body. In addition, there are half a dozen or less suppliers of solder and he suggests that these sources be tapped for information regarding all the solder furnished to the automobile body trade. The War Production Board could well coordinate such a program and would be able to develop (in cooperation with the body builders) a set of outline drawings showing various types of bodies and the solder spots on each. Then when a 1932 automobile body manufactured by company "X" came into a graveyard or scrap yard, the operator could refer to the outline drawing and find the spot at which the largest quantity of solder would be present. Since the bodies are generally cut up prior to baling, it would be no difficulty to cut out and save the sheet metal areas where the solder is lodged. These pieces could be processed either by the simple (albeit expensive) torch to melt off the solder, or by running the pieces through a simple furnace with a temperature of about 500 deg.

Within the solder trade consider-



THUNDERBOLT: One of the first flight pictures of the Republic P-47, said to be the world's fastest single engine craft. Powered by a 2000 hp. Pratt & Whitney radial air cooled engine, it has a 40,000-ft. ceiling and has done better than 400 miles per hr. in level flight.

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Just entering the work. We delayed turning on the coolant to show you the first chips.



Split-second later, the first splash of oil hits the tools, but hasn't yet covered the job.



P&W Photos — Unretouched



PRATT &

WHITNEY

Division Niles-Bement-Pond Company
WEST HARTFORD, CONNECTICUT

Gangway, Goering

Here Comes Our Gang!

HERE'S a blitz-shot series of photos that would give any metal working German a sleepless night.

This is a gang of six Pratt & Whitney staggered-tooth milling cutters, mounted on one arbor and really putting the bite on a chunk of war production work.

Ripping off the chips, yes, but *accurately*. Like all P&W small tools, these cutters were shaped, hardened, sharpened, and selected for their jobs with as much care as the R.A.F. puts into a raid.

Wherever the goods of war are a-building in America, there are P&W tools at work . . . and that likely includes *your* plant too, Mr. Reader. So get this: *don't spare the pressure* . . . your P&W tools can take it. Keep 'em cutting; there are more where they came from. We're making them, and you're working them, twenty-four hours a day.

Coolant streams not yet adjusted, but we're wheeling! Cutters walk right through the work . . . will be ready to tackle the next piece in jig-time.



able interest was expressed last week concerning this idea. It was pointed out that the solder could be used over again and the mixture changed to any desired alloy ratio. There would be no attempt to reclaim the pure tin, probably.

Since most of the auto bodies being scrapped are those of older model cars, a maximum recovery of solder should be possible. The quantities would depend upon the efficiency of the program and the number of cars scrapped but an indication is given by the June report of the WPB concerning automobile graveyards. This report indicates that the graveyards of the nation produced 453,768 tons of scrap metal in the month. If broken down into the number of cars scrapped with an average of 1300 lb. each (as was done with the Michigan figures) the nation yielded about 698,105 old automobiles in June. If the average amount of solder recovered was 5 lb. per body, the total salvaged material might amount to nearly 3½ million lb. or nearly 1800 tons.

Another worth-while suggestion on metal salvaging came during the past week from T. L. Parker of Columbia Steel & Shafting Co. and Summerville Tubing Co. He points out what many steel representatives in the field already know: many of the smaller plants are very slow to get into the swing of things to contribute their scrap through the normal trade channels, or any other way. It is a pretty widespread observation that plants that are busy day and night on war goods sometimes do not have anyone to think about the problem of disposing of scrap. And it isn't a money-making proposition in many cases, or at least the small plants don't see it that way. Moreover these same plants are very slow at getting in line with the program for segregation of alloys and various types of scrap. Parker suggests that the sales force of every steel company in the industry and all of the warehouse people and others who contact industry on the behalf of steel, do a little educational work, and a little prodding if need be, when they encounter such conditions. He's right, we feel, and a consistent drive by every salesman and service man representing the steel industry could do a great deal to keep scrap moving where it is needed. Such personal, direct action would be a splendid contribution that would match the indus-

try's current advertising drive aimed at the public and urging it to see that all available scrap reaches the steel mill.

NO matter how many years a reporter spends on the labor beat, he keeps getting fresh surprises. Last week in Michigan newspapermen sat a little goggle-eyed as they heard C. E. Wilson, president of General Motors Corp.,

Amount of Solder on Typical Auto Body

	One Side	Per Job
Front end to		
roof rail . . .	2.00 lb.	4.00 lb.
Roof to deck . .	1.00 "	2.00 "
Hinge pillar . .	.375 "	.75 "
Deck lid . . . .	.50 "	1.00 "
Dog leg . . . . .	.187 "	.37 "
		8.12 lb.

outline the high pressure methods being used by the CIO and the AFL in an organizational dispute in Pontiac during which a group of grocery clerks—aided and abetted by UAW members—managed to close down a major armament producer and publicly threatened to close down other arms producing plants in this community just north of Detroit.

The argument which shut the Pontiac plant and halted production of Oerlikon anti-aircraft guns for the Navy, tank parts for Cadillac and diesel engine parts for Detroit Diesel Engine Division of General Motors Corp., also halted tool work and revamping of parts of the plant for new production of other vitally needed war material. It was no labor-management argument, but simply a jurisdictional dispute between AFL and CIO unions over the organization of retail clerks and delivery men in the markets and grocery stores of Pontiac.

Wilson graphically painted a "flow chart" which showed the kind of pressure that the union had exerted in its organizational drive, leading up to the closing of the Pontiac plant. Both AFL and CIO groups had begun an organizational campaign and each claimed some membership in some stores. With the pressure on, the independent grocers agreed as a group that they would sign a contract with the CIO clerks, principally on the theory that most of their grocery-buying customers were CIO workers in

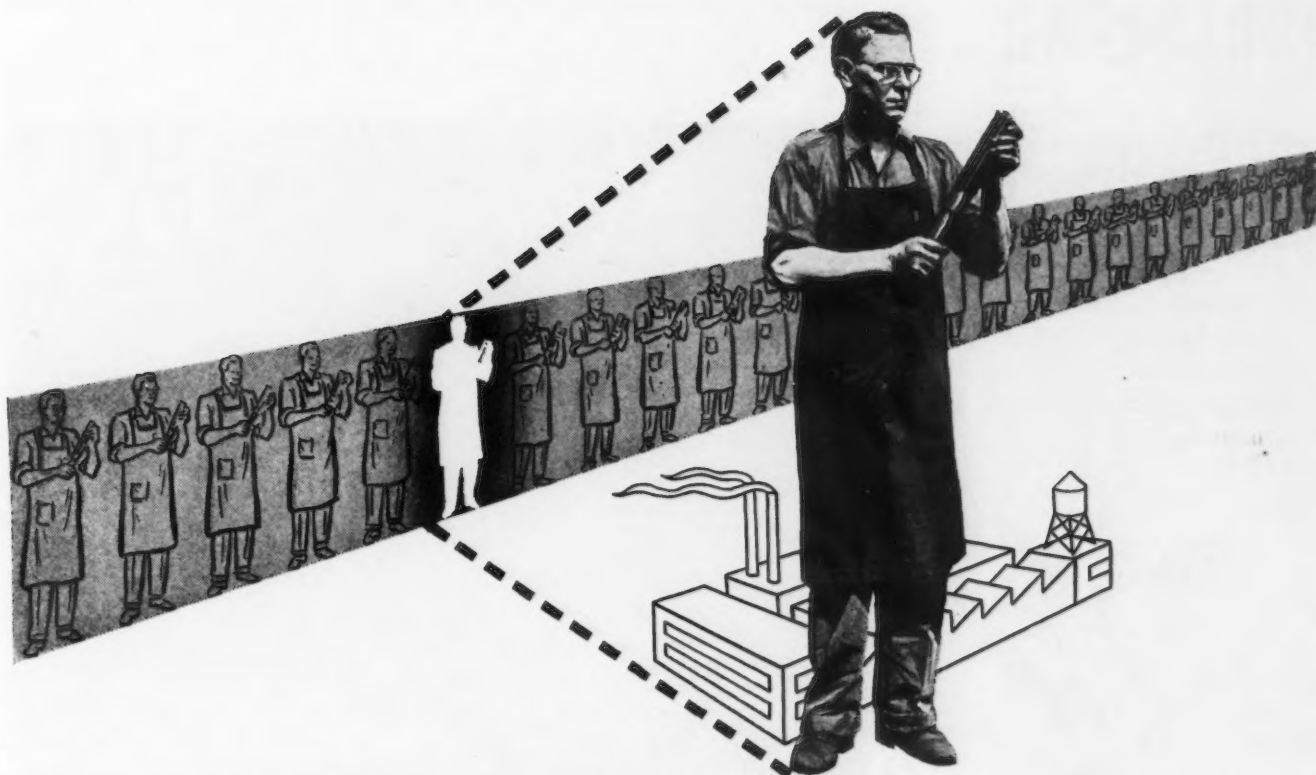
plants in the vicinity. Then the AFL truck drivers boycotted the independent stores and refused to deliver goods to them. In an attempt to display their own strength and, apparently in an attempt to force the plant management to exert pressure on chain stores (with some AFL clerks and AFL teamsters on the pay roll) to swing over to the CIO, this organization decided to close the General Motors arms producing plants.

The CIO maneuver was a tacit admission that it knew that General Motors management wanted to continue the production of war goods. The CIO hoped that this desire would be strong enough to lead General Motors into the path of exerting some special kind of pressure on the AFL employers to get them to sign up with the CIO.

WILSON castigated the union leaders in a meeting with the press in Detroit.

"I think it is a terrible disgrace for labor leaders to so abuse their powers and disregard the nation's interests in shutting down big war plants which have nothing to do with their argument at all. It is still a question whether all local union leaders are so selfish and shortsighted as to be behind this move. I know that the men are not. There must be subversive agitation by people who care nothing about our country," Wilson declared. He sent telegrams of protest to Donald Nelson, chairman of the WPB; Frank Knox, Secretary of the Navy; W. H. Davis, chairman of WLB; Dean Wayne L. Morse, public member of WLB, and to R. J. Thomas, president of the UAW and also a member of WLB. In these telegrams he called on these officials to do something immediately to bring about resumption of employment at the Pontiac plant where 7000 men were out of work with about 25 CIO grocery clerks and other CIO members at the gates to keep them out.

Incidentally, Wilson declared flatly that Pontiac employees who are members of the UAW-CIO, and some who are also UAW committee members were taking part in the picketing. These individuals were identified by observers at the scene. This, he pointed out, was an obvious breaking of the contract with General Motors Corp., as well as being an act definitely opposed to the public interest of this nation at war.



"25 Tool Makers Needed for Every 1 Available!"

There's a mighty tough training job to be done, and it must be done quickly!

You can train *more* tool makers and *more* tool designers *faster* by taking advantage of Carpenter's program of *All Aid to Tool Steel Users*. It is a program backed by years of research and experience with tool steel problems.

In tool rooms and production shops, Carpenter is helping to answer such common questions as *How to eliminate grinding checks?*; *How to design for longer tool life?*; *How to make tools that wear longer?* The foundation of this program is "Tool Steel Simplified," a 315-page handbook . . . *written in shop language*.

Easy to understand, it helps each tool maker and apprentice apply its practical working information to his particular problems. The chapter on *Trouble Shooting* is particularly valuable in training tool makers.

Over 25,000 copies of this handbook are at work in industry now, simplifying apprentice training and helping to get more output from each pound of tool steel. "Tool Steel Simplified" is available at cost—\$1.00—to tool steel users in the U. S. A. (\$3.50 elsewhere). After you have read it, you will see why more men in your plant should have copies of this useful handbook.

THE CARPENTER STEEL CO., Dept. 101, READING, PA.



Use "Tool Steel Simplified" as your in-the-shop training assistant . . . and remember that your nearby Carpenter representative and our Metallurgical Department can provide real help to enable you to solve new "tooling up" problems.

"Tool Steel Simplified" is available at cost—\$1.00—to tool steel users in the U. S. A. (\$3.50 elsewhere). 315 pages, 205 illustrations. Send for your copy today.



Washington . . .

• Widely confused PRP plan is explained in simple language . . . Filing of interim application forms explained in detail . . . Other misunderstood points clarified and future changes hinted at in this week's column.



WASHINGTON — Much confusion has been caused by what WPB calls the principal instrument of the priorities system, the Production Requirements Plan. WPB is criticized by industry for creating a scheme that impedes the war effort because of the amount of paper work PRP entails. Members of the steel industry in Washington say that the plan is fine in theory, but would require so many government clerks that there is not enough office space to house them.

The committee working on the reduction and consolidation of reporting forms headed by Joseph I. Lubin, New York accountant, expects to be able to dispense with most "PD" forms by October. PRP itself is expected to supplant many of them.

Valid criticism could be made of the fact that WPB has not done a good missionary job in explaining how to operate under the plan, nor an outstanding job in selling the plan to industry. Whether other criticism is accurate and justifiable, only a trial will tell.

WPB asks the industry to furnish the following information on PD-25-A, the principal form under the PRP plan: (1) raw material inventory records; (2) products manufactured; (3) rate of material consumption; (4) esti-



THEORETICALLY POSSIBLE: Maritime Commission Chairman Admiral Emory S. Land talking to Senator Ellender, right, of Louisiana. The Admiral told the Truman committee that it is possible to build Liberty ships in 400,000 man hours, but characterized as theoretical the claim of Andrew J. Higgins that he could do it in 300,000 hours.

mated requirements for a succeeding quarter or quarters; (5) previous quarter shipments by classes of products showing percentages shipped at the various ratings; (6) unfilled orders and the ratings therefor by percent, and (7) materials required on Materials List No. 1.

Ratings authorizing the procurement of definite amounts of material are assigned on the basis of this information.

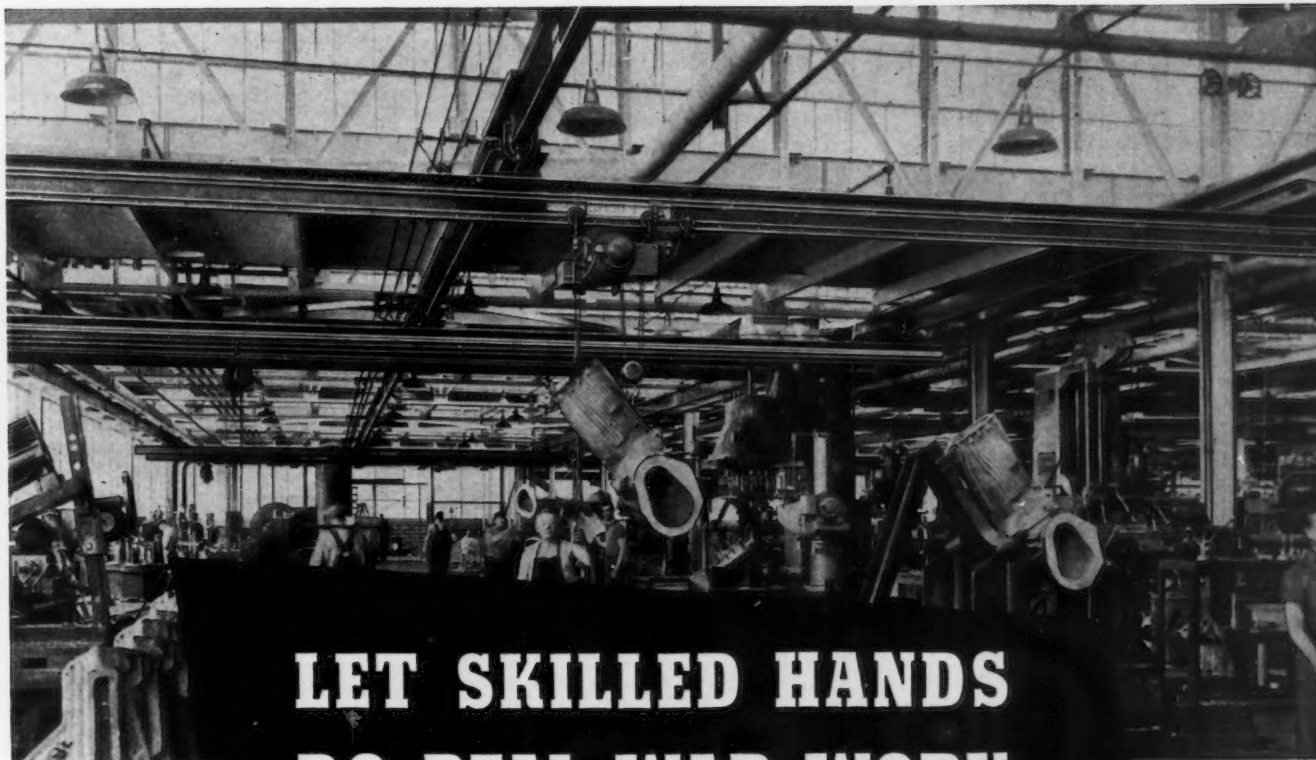
However, in practice, ratings are determined by the rating pattern which unfilled orders make. Unexplained material requirements or excessive inventories may be reasons for deductions from material requests. If a manufacturer of combat items has unfilled orders which are 90 per cent A-1-a, he is likely to receive 100 per cent of the material and the A-1-a rating to get them.

Decided weakness in the PRP plan is that WPB still has no way of knowing whether a manufacturer gets his materials on the ratings assigned until the PD-25-A for the succeeding period is filed. Consequently, over-all material con-

trol is not possible because WPB does not know just how much material it has handed out. Furthermore, though material parceled out is counted in many instances, at present it is not made a consideration in the granting of ratings. However, WPB hopes to get the plan working better in the fourth quarter and this is the reason the war agency has requested the filing of PRP on Aug. 10 covering the fourth quarter. WPB expects to get demand figures which it can employ during the processing of the application for the next quarter.

THE following analysis shows how to operate under PRP. The instructions accompanying Form PD-25-A tell how to fill out the form.

After PD-25-A has been filled out and returned to the manufacturer with the ratings and materials allowed, the first thing the manufacturer should do is to set up records to control the material he is authorized to purchase. The records should show purchases against the quantities allowed, and the balance. WPB does not care



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American MonoRail Overhead Handling Equipment will eliminate delays in your production — from unloading raw materials to loading your finished products. In every operation where handling is involved, American MonoRail Engineers have been able to speed up production by eliminating delays, relieving skilled labor from lifting and carrying, reducing accidents, conserving energy and increasing efficiency.

American MonoRail Systems are playing a vital part in speeding up production in hundreds of plants engaged in war work. Supplied for manual, electric or automatic operation. There is no interruption during installation. Call in an American MonoRail Engineer — he will show you how it can be done in your plant.



WRITE FOR Blue Book
illustrating hundreds of
MonoRail installations.



Special crane swivels on one end — telescopes on other to serve 4 furnaces.



Simple MonoRail loop provides quick handling through heat treat operations.

THE AMERICAN MONORAIL CO.

13103 ATHENS AVENUE



CLEVELAND, OHIO

what type of records are kept or whether a producer keeps a perpetual inventory just as long as some records are kept.

For instance, a typical rating pattern is 25 per cent A-1-a, 25 per cent A-1-j and 50 per cent A-2. The producer need not place purchase orders for the entire material bill at once. Orders bearing the ratings may be placed as often as needed and in any amount so long as they do not call for more material than has been approved by WPB. It is also possible to place a single purchase order showing all of the ratings. For example, if a manufacturer has been authorized to purchase 1000 units, he may place an order for 250 units at A-1-a, 250 at A-1-j, and 500 units at A-2. On the other hand, WPB says that he may not on that purchase order express his ratings in percentages saying, "I want 500 motors, one-quarter at A-1-a and three-quarters at A-2."

ANOTHER way of purchasing and one that WPB favors is for a manufacturer to buy at a rating the total number of units certified at that rating, plus the material approved by WPB at any or all ratings above it. For illustration, where the total unit authorization

is 1000 motors, an order can be placed for 500 motors at A-1-j, not using the A-1-a, or it is possible to order the whole 1000 at A-2. The advantage of this method is that it permits the manufacturer to use the higher ratings to expedite delivery where necessary to place a higher rating to get delivery on a portion of the order.

When a PRP certificate is received, the ratings assigned in the authorization block may be used in purchasing and in rerating outstanding purchase orders. However, a manufacturer may not use any preference ratings other than those assigned on the PRP certificate (including all certificates in the PD-25 series) except for plant expansion, construction, or capital equipment, reratings in the super rating bracket, and ratings specially granted by WPB.

In the event outstanding purchase orders, whether previously rated or not, cover quantities in excess of those authorized on the current PRP certificate plus the balance not yet received on any previous certificate then the PRP user must cancel or reduce its outstanding purchase orders calling for delivery within the quarter so that no more material will be delivered than has

been authorized on the current or previous certificates.

THIS is exemplified by the case of a PRP user who has secured approval for the purchase of 1000 units, and has extended a rating or PD-3A or PD-1A certificates for 400 units and has scheduled these units for delivery during a succeeding quarter. WPB requires that the 400 units be deducted from the total of 1000 and no more than 600 additional units may be purchased during the current quarter.

However, using the same quantities in the foregoing example in the case where 1000 units have been authorized and ordered, only 600 were delivered during a given quarter. During the next quarter if the user receives approval for 800 units he is still entitled to receive the undelivered 400 units.

When the original PRP does not authorize sufficient material to meet a manufacturer's expanding requirements, he may file the interim application form PD-25-F. If it happens that his rating pattern has changed meanwhile from 10 per cent A-1-a to 30 per cent A-1-a, etc., he is entitled to reassign the higher ratings he receives on the interim certificate.

A producer may accomplish this in one of the following ways:

Notify his suppliers in writing that the previously assigned ratings have been canceled and furnish them with duplicate orders carrying the endorsement of the ratings assigned.

Advise suppliers of the change in rating by mail listing the purchase orders on which the ratings are to be changed, giving the numbers, the original rating and the new with instructions to file the letter with the original order.

Allow its outstanding orders for the entire authorized quantity of any single items to stand at the ratings previously assigned unless the new ratings are lower or for reduced amounts. Reassignment of ratings must be applied to all and not part of any authorized quantity.

Cancel or reduce its outstanding orders if ratings assigned by the interim certificate are lower or are for smaller amounts of material.

Each PRP user is instructed so far as practicable to place his purchase orders for the material rated or authorized on his certificates so as to call for substantially equal deliveries during each of the three months of the quarter. The user should not, unless absolutely necessary to maintain his delivery schedule or to obtain the minimum quantities procurable, order for delivery during the first month of the quarter more than 40 per cent, or during the first two months more than 80 per cent of the total quantity of any material.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



Speed Up GUN BARREL INSPECTION

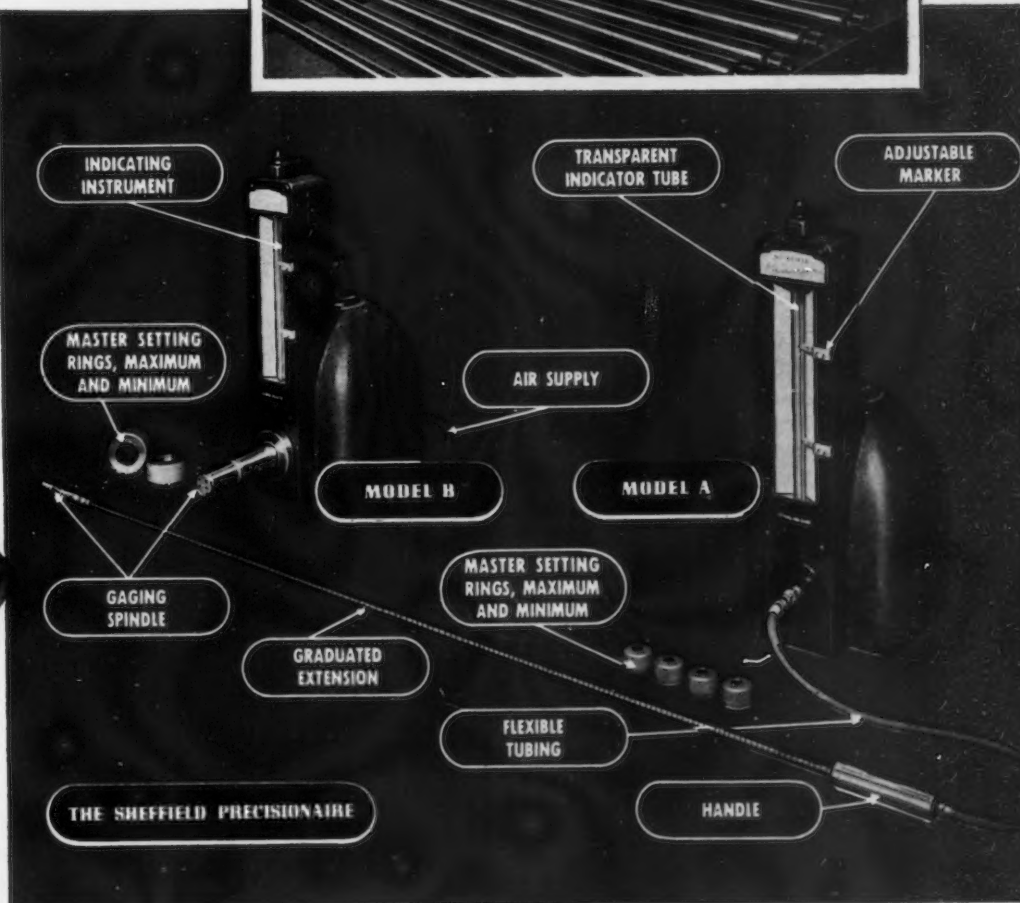
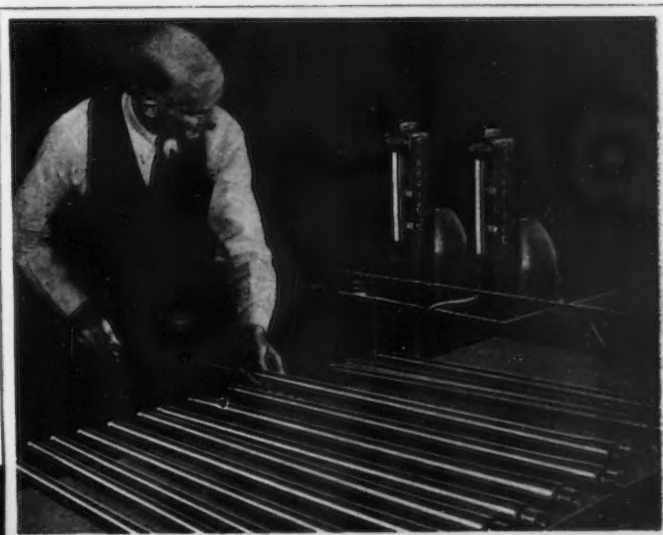
In just one pass through a gun barrel the Sheffield Precisionaire tells the inspector whether or not the bore is within prescribed tolerance or, if not, whether it is oversize, undersize, out-of-round, or bell mouth —also exactly at what point any dimensional discrepancy occurs.

It takes no longer to inspect a gun barrel than it does to push a cleaning rod through it and no more skill, in spite of the fact that the Precisionaire is accurate to .0001". Any new operator having no previous experience can be taught to handle this gage in less than fifteen minutes.

Contrast this speed and this accuracy with inspection by previous methods which were not only slow but which required the highest order of gaging skill in order to maintain accuracy.

The same instrument provided with two slightly different gaging spindles is used to check the bore before rifling and then, by changing the spindle, give it a final inspection after it is rifled.

The Precisionaire, while it is being used extensively for gun barrel inspection, has a number of other very important uses all described in bulletin 42-23. Write for your copy now.



THE SHEFFIELD
CORPORATION

DAYTON, OHIO, U. S. A.



WEST COAST.

• August looms as a critical month for Coast shipbuilders . . . Some yards are handicapped more by lack of heavy frames and beams than by plates . . . Expeditors and order followers are being used to trace delayed shipments.



SAN FRANCISCO—Back of the change from emphasis on the rolling of plates to a wider range of steel products, embodied in WPB instructions to mills, lies a situation in which some Pacific Coast shipyards have been more handicapped by lack of heavy frames and beams than by plates.

Labor pains incident to the birth of the production requirements plan and past conflict between the Maritime Commission and WPB are the two principal causes of current shipyard steel worries. Looking backward, most problems have been solved satisfactorily and production maintained. Looking ahead, August looms as a critical month. August schedules for one big yard were not forwarded by the Maritime Commission until the middle of July, reports indicate, and steel inventories are running low. Although the possibility of a temporary shutdown of this yard during the month is not being discussed widely, it may well occur. Once over the August hump, September should be clear sailing, for September steel requirements were provided for at the same time as those of August.

Yards participating in the Maritime Commission program still are not sure just where powers of the Maritime Commission in plotting steel schedules leave off and where those of the WPB commence. Introduction of PRP has not lessened the confusion.

Like other Pacific Coast steel

customers, the shipyards have experienced difficulty in obtaining deliveries from eastern mills on schedule. The trend is towards expeditors and order followers.

For the future, speed records in the building race will become fewer. Allocation of material based on delivery dates in original contracts will not allow speedy yards to get too far ahead in the race. Thus, schedules are being modified to permit a slower, more constant pace, rather than speeding ahead to be brought to a halt by lack of steel. Throughout the war program an increased emphasis on constant pace is evident on the Coast.

WHILE lack of structural steel has been slowing the shipyards, big shapes have been piling up at an eastern Washington aluminum plant where a shortage of cranes has delayed building. As railroad cars are unloaded to release rolling stock for other service, steel is piling up along the tracks.

Recognition that the spotty situation in structural shapes might constitute a permanent impediment in the Coast shipbuilding program was contained in the recent recommendation by W. A. Hauck, WPB plant expansion chief, that a structural mill be added to the big government-owned Utah steel plant to be operated by Columbia Steel Co. Previously announced plans for the Utah plant had contemplated only blast furnaces and a plate mill. Although the pig iron capacity increase may be felt early next year, it is doubtful whether the plate mill will commence rolling before the end of the first quarter or the structural mill until about one year hence. A knocked-down blast furnace, now being reerected at Columbia's other Utah plant, should be blown in by Thanksgiving, thus bringing relief to Coast open hearths at a particularly critical period.

Mr. Hauck, himself, toured the Utah plants last week, later visiting the Kaiser plant under construction in southern California, and going on to Texas. Recommendation by Mr. Hauck that a structural mill be built in Utah may mean that the campaign for such a mill by the Kaiser Co. in southern California has been unsuccessful. It is understood that Kaiser marketing studies now under way definite-



GOVERNMENT INSPECTOR: This attractive blonde is a government inspector checking shell case dimensions in a small Pacific Coast plant converted to war production.

ly contemplate other products than plates as a long run, after the war proposition.

HOT on the heels of OPA denials from Washington that a general scrap price increase is impending are reports circulating here that both WPB and OPA regional officials on the Coast have recommended a shipping point price system for all remote scrap to replace the present scale providing higher delivered prices only for steel scrap originating out of the State. A uniform price schedule of shipping point prices long has been advocated by the mills as the only practical means of luring remote scrap from areas just within the boundaries of the Coast states into trade channels. Although the problem may seem academic to cloistered Washington price economists, it has particular significance in California where substantial tonnages of abandoned mine scrap is located in the mountainous areas adjacent to the eastern and northern boundaries of the State. Scrap originating out of State, just over the borders,

THE *Lever* THAT MOVED THE WORLD



"Give me a lever long enough and a fulcrum," said Archimedes, "and I can move the world." But long before Archimedes a lever in human hands *had* moved the world profoundly.

The prehistoric experimenter who first used a crude lever to do what his own strength, directly applied, could not accomplish, changed the whole future of the human family. For the lever was probably man's first machine—his initial step in moving loads exceeding the limitations of his own muscles.

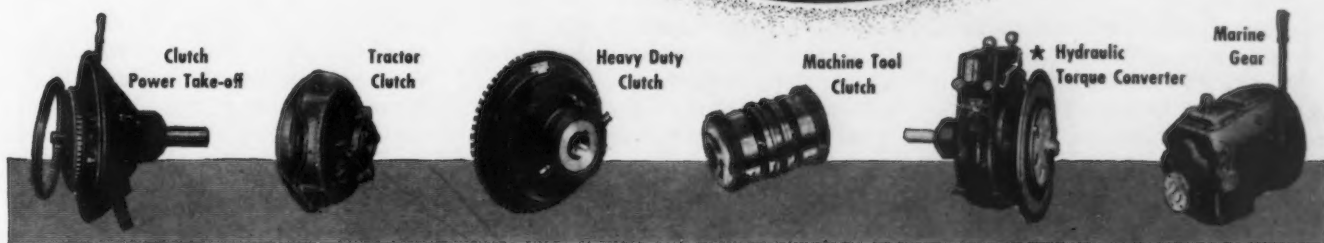
Today man has motors and engines to supply power for him, but all of them depend upon speed for effective results. To pick up a load from a standing start, after the driving unit is in motion, demands a connecting link which will apply the load *gradually*.

The development, improvement and economical manufacture of devices for this purpose is the specialized business of the Twin Disc Clutch Company. For 24 years this company has worked intimately with manufacturers, large and small, whose products range from machine tools to oil rigs, from power shovels to locomotives, from motor boats to farm tractors. Wherever power must be applied to a load, there is a Twin Disc product built for the job.

If you build, or plan to build, equipment incorporating driving and driven units of 1 to 800 HP, it will probably pay you to get in touch with us. Present deliveries are confined to essential war needs, but our engineers will be glad to work with yours . . . in strictest confidence, of course . . . to plan now for the days to come. TWIN DISC CLUTCH COMPANY, Racine, Wisc.



The Twin Disc hydraulic torque converter* provides the "leverage" necessary to start and maneuver a huge military tank. Without gear shifting, an infinite range of speed ratios is automatically applied as needed.



has been allowed a differential price at Coast consuming points, while scrap originating a few miles away, within California, allegedly has not moved because of the necessity of dealers absorbing excessive freight charges. With an acute scrap famine in prospect at Coast mills this fall, recommendations of OPA

Wage stabilization parleys for the West Coast aircraft industry, which broke up three weeks ago amid conflicting statements by representatives of the WPB, OPA and War Manpower Commission now have been postponed for the third time, with no date set for resumption. When the Los Angeles con-

C. I. O. United Automobile Workers Union and North American and subsequent certification of the case to the War Labor Board was due not to the wage question but to differences over union security. The union is understood to be holding out for closed shop and check-off provisions which it failed to achieve a year ago after the Army halted a widely publicized strike.



CONVERTED FROM WINDOW SCREENS: The adaptability of small West Coast plants in swinging into war production is exemplified by this view of a plant formerly devoted to window screen manufacture and now working on artillery shell cases.

and WPB officials-on-the-spot may carry more weight than other pleas by Coast officials of these agencies in the past.

Appointment of regional czars to decentralize WPB administration, originally announced last spring, so far has been little more than a sop to West Coast industry. Feeling is still prevalent that, barring a few minor concessions, power of action still is jealously guarded by Washington, D. C., department chiefs unfamiliar with far Western problems.

WAR production contracts on the Coast continue to pile up. Contracts for the Puget Sound, Washington area from June, 1940, to February, 1942, were four times greater than the total volume of all goods produced in that region in 1939. Procurement of ordnance in the State of Washington now exceeds that in both Oregon and California, according to the Seattle sub-office of the San Francisco Ordnance District.

ferences adjourned, Paul R. Porter, WPB wage stabilization chief and top boy among Government labor negotiators, hurried to Washington to probe White House views on wage raises in the industry. Once armed with reassurance that some increase would be permitted, he apparently had hoped to reconvene the meeting in Washington. Failure of the stabilization conference to resume as scheduled now is interpreted in some quarters as indicating that the presidential foot has been put down on any increase whatsoever, and that an official nationwide pronouncement on the wage issue will be forthcoming soon. A possible alternative would be a super-conference to determine nationwide wage policy with Porter as likely chairman.

Wage clauses to be inserted into contract renewals now being negotiated between the C. I. O. and Vultee and North American hinge on such a determination of national policy. Breakdown of negotiations last week between the

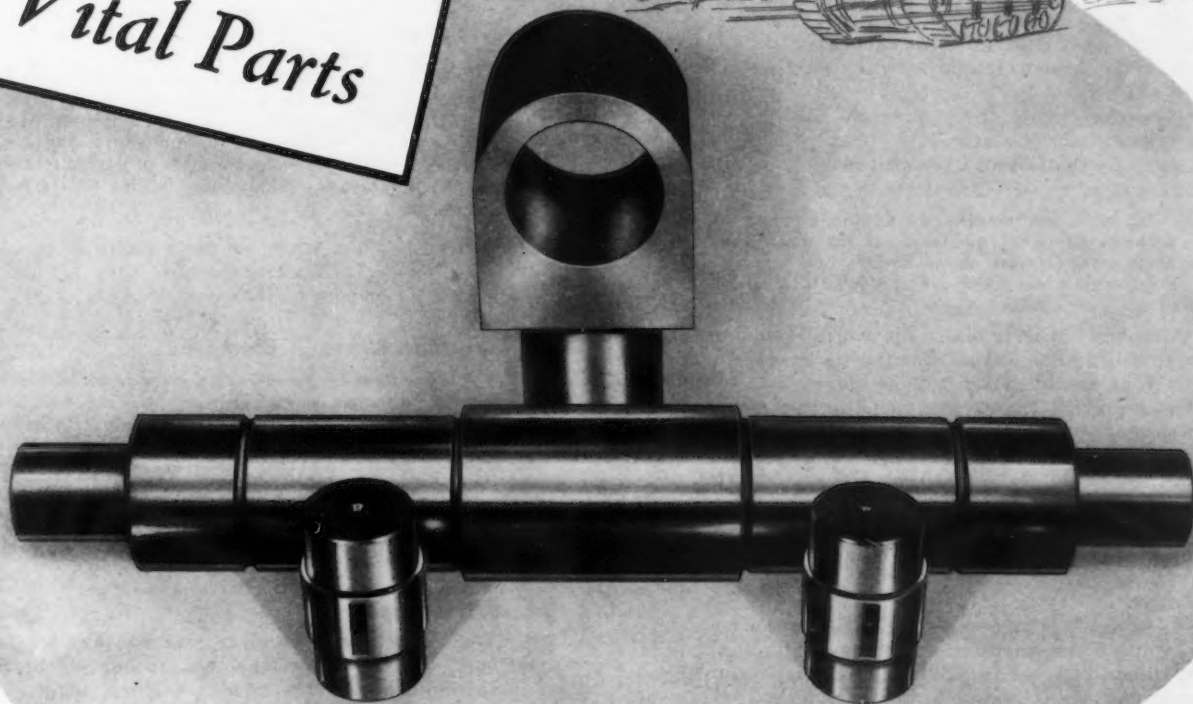
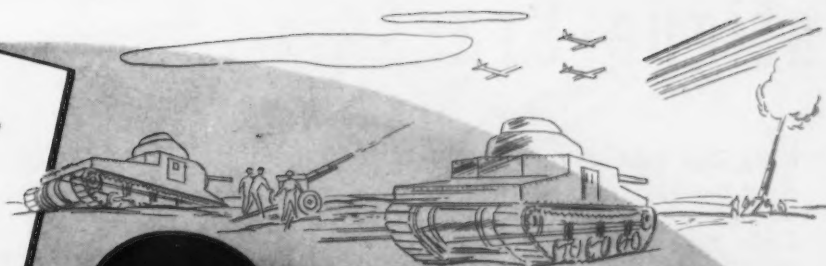
UNION difficulties also are plaguing Consolidated Aircraft Corp., San Diego, where the National Labor Relations Board filed a formal complaint of unfair labor practices against the firm following demands of the largest A. F. L. aircraft union in the country. The A. F. L. International Association of Machinists, collective bargaining agents at the plant, complained of discrimination against union members and "failure to bargain in good faith." Although company-union difficulties have never reached the strike stage, friction long has been constant.

Major R. H. Fleet, who several months ago relinquished control of Consolidated to Tom Girdler and Aviation Corp. interests, last week endorsed in principle heavy troop and cargo carrying aircraft. His recommendation, significant because he has had experience in building both land and water based planes, was for land based aircraft built along conservative lines.

"Several types of air carriers for troops are possible" he declared. "The cheapest and by far the quickest to get would be cargo and passenger type Consolidated Liberators (B-24's)."

Completion of the high-tension grid which enables the Pacific Northwest to become the principal American haven of heavy electric power consuming industries was achieved last week by energization of the final section of transmission line between Grand Coulee Dam and Covington, Washington. The Grand Coulee-Covington section of 183 miles is the longest uninterrupted high voltage steel power line in the world, according to the Bonneville Power Administration. Construction was started just a year ago. The complete Bonneville Loop now joins both Grand Coulee and Bonneville Dams with the Puget Sound industrial area and the Portland-Vancouver area. Principal consumers are aluminum reduction plants.

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Vital Parts*



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AIRCRAFT QUALITY STEELS • STAINLESS STEELS
NITRALLOY STEELS • BEARING QUALITY STEELS

"THE WILL TO MAKE GOOD STEELS"

Fatigue Cracks

BY A. H. DIX

"We Can Lick Any . . ."

• • • We have just returned from our annual two-weeks layoff and are ready to resume telling Admiral Leahy what to do to win the war. One of the things we think he should do is to suggest that cartoons which are boastful or which demean the enemy are impeding the war effort.

Cartoons giving the impression that the Nazis and Japs are pushovers are comforting. But we do not yet need to be comforted. We still need to be alarmed.

This item appeared recently in the *New York Times*:

Big signs are erected during the night (by Russian propaganda units) and confront the enemy each day-break with the work of the Soviet's best cartoonists and sloganmakers, all poking fun at Adolf Hitler and his plans of world conquest.

Although Hitler's plans for world conquest seem to us to rank with spinal meningitis in amenability to humorous treatment, it will be observed that the Russians are using the cartoons on the enemy rather than on the home populace.

It seems to us that cartoons which play the enemy down are definitely narcotizing and give the impression that we can win with one hand tied behind our national back. There are times when paregoric serves a useful purpose, but we still need the adrenal "Wake up, America" dosage rather than a "There, there now" sedative.

We are not suggesting that our superiority complex be swapped for an inferior complex (although the latter, when identified and followed by compensatory measures, has been known to work wonders). But our mantle of superiority might be put in mothballs for the duration, or at least until we have won the right to wear it again.

Big Skip

• • • A booklet issued by a ferro alloy manufacturer reads, "With the exception of manganese, no other metal is more generally used in steel making than silicon." They missed one.

—Harold W. Lowrie,
Feeder Division,
Westinghouse Elec. & Mfg. Co.,
Trafford City, Pa.

Apronymic Unveiled

• • • You say, "Lt. Com. L. H. Burkhead's name is within one letter of being apronymic." Unable to find it in local dictionaries, including Webster's unabridged 1941 issue. What is the meaning, please?

H. A. Deuel,
Pittsburgh, Pa.

Apronymic was coined by Franklin P. Adams to designate a name that sounds like the job. Example: if Wright Aeronautical's R. F. Gagg took a job with the Office of Censorship the name would be definitely apronymic.

Postbellum Assignment

• • • The post office has just delivered a letter written to us on Nov. 11, 1941, by the Bureau voor Handels-inlichtingen, Oudebrugsteeg 16, Amsterdam, Holland, reading:

We have been asked for an up-to-date list containing selected addresses of manufacturers and exporters of iron, steel and works thereof, in the United States. You would oblige us very much in sending us such a list.

Suspension of postal deliveries and censorship lay a double stymie to our desire to serve. The Bureau's request has been filed in our Things-to-be-done-after-the-war folder.

Fast-Walking Hell-Dispensers

• • • Nuts to your dictum that those who get the most done never seem to be hurried. I suppose you also think that liars can't look you in the eye, square jaws indicate determination, watched pots never boil, the more haste the less speed, and still waters run deep.

I never saw a bird with only a pad and pencil on his desk and lots of time for everything who didn't have a flock of guys doing his work for him. What this war needs is more guys who walk around fast and give everybody hell before going back to the mountain of papers on their desks and a sanwidge and a cuppa cawfee on the pull-out slide.

—Deac

They awe us, too, when we read about them in the *Satevepost* stories. But in real life they always end up with ulcers or coronary thrombosis.

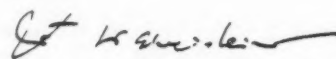
Proofreader Blows A Blue One

• • • Your item on proofreading reminds me of something that happened years ago when *The Iron Age* had a sister publication named the *Metal Worker, Plumber and Steamfitter*. The editor, George Cope, wrote a very important editorial, the start of which should have read, "In a recent issue of the *Metal Worker*." Instead it came out in the paper, "In a decent issue of the *Metal Worker*."

—C. S. Baur, V.P. & G.M.,
THE IRON AGE

Sanskrit Signatures

• • • Our collection of novel signatures has two new additions. Dr. W. Schweisheimer, author of the July 16 article on health hazard in working magnesium, signs himself thus:



And this example of compact penmanship is the legal signature of Walter A. Shields, secretary of the Shields Manufacturing Co., Long Island City:



Mea Culpa

• • • Looks like your Proofreader No. 2 missed one on the last sentence in first paragraph under "Triple Check." There is no antepenultimate "i" in "Constitution." You should have said "antepenultimate letter," which happens to be "i."

Right?

—G. L. vonPlanck,
Chief Metallurgist,
Columbia Steel Co.,
San Francisco, Cal.

Right.

Death by Degrees

• • • Gas gangrene . . . is a highly fatal disease . . .

—The Iron Age, July 16, page 56

Somehow it makes us think of a line sung in "The Spring Maid" by our first dream girl, whose last name was MacDonald, but whose first name we forget. When she learned that her sweetheart had a date with a firing squad, she sang a song beginning, "Shoot him gently . . ."

Puzzles

• • • Last week's train was traveling 32 miles per hr. Ten minutes is par for this:

The sum of the square and the cube of a number is twice the number. Find the number. Give both solutions.



MODIFIED 18/8

Arcos Chromang electrodes were developed with two thoughts in mind—to produce superior welds on air hardenable steels and to save critical chromium and nickel. You can be sure it's right if it's Arcos.

CHROMANG

Meets recent specifications for this type of electrode.

CHROMANG

1/8" to 3/16" for all position welding.
1/4" and 5/16" for downhand welding.

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Distributors Warehouse Stocks in the Following Cities:

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OKLAHOMA CITY, OKLA. Hart Industrial Supply Co.
PAMPA, TEXAS Hart Industrial Supply Co.
PITTSBURGH, PA. Williams & Co., Inc.
PORTLAND, OREGON Industrial Specialties Co.
ROCHESTER, N.Y. Welding Supply Co.
SAN FRANCISCO, CALIF. Victor Equipment Co.
SEATTLE, WASH. H. A. Cheever Co.
ST. LOUIS, MO. Machinery & Welder Corp.
SYRACUSE, N.Y. Welding Supply Co.

Dear Editor:

STEEL FIGURES

Sir:

I have before me the July 23 issue, which shows steel consumption for the year 1941. I note the total is a little over sixty-two million tons. It is my impression that we consumed, last year, over eighty million tons.

Structural steel shows 1,930,298 tons under the heading of "all other." It might be well to explain this in more detail. How about all of the steel that goes into war business and to the Allies?

LEO F. CAPRONI,
New Haven, Conn.

• The total of 62,000,000 tons consumed is finished steel. The figure of 80,000,000 is the ingot figure prior to conversion. Naturally, export figures are disguised at present, and as to the amount of steel going into direct war business, you may not expect to see accurate figures on this for the duration. The Annual Review Number of THE IRON AGE, Jan. 1 of this year, goes into more detail on "all other" classifications.—Ed.

NASHCRETE

Sir:

We note that some of your readers are inquiring about "Nashcrete." The makers are T. F. Nash (Construction) Ltd., Uxbridge Road, Hayes, Middlesex, England.

A. STRUGNELL,
News Editor,
Planet News, Ltd.,
London, England

WAREHOUSE HISTORY

Sir:

We are writing in the hope that you have some pamphlets which treat of the history, function and importance of the steel warehouse in our present economic system.

T. J. RAFFERTY & CO., INC.,
Worcester

• We have never published material of this type, but believe such data have been submitted in lecture form before the Steel Warehouse Association, 422 Terminal Tower, Cleveland.—Ed.

WPB FORM

Sir:

We received a copy of your sixth edition priority guide and value it highly, under the present conditions. If you can furnish us a copy of priority regulation No. 12 and revisions, it will be appreciated.

H. M. CLARK,
Buckner Mfg. Co.,
Fresno, Cal.

• We are sorry we are not in position to furnish copies of WPB orders, and suggest you get in touch with your

local WPB office, which can supply you.—Ed.

HAXON

Sir:

We are interested in a Haxon thread miller or thread milling attachment, and would like to know who makes it.

A. G. WIGGLESWORTH,
Wigglesworth Machinery,
Cambridge, Mass.

• This sounds as though it might be an imported machine, though we do not know of it. The closest name, phonetically, of which we know is the Hack Machine Co., Des Plaines, Ill. Perhaps one of our readers is familiar with the machine you seek.—Ed.

COST ACCOUNTING

Sir:

We are considering renting some of our machine tools part time, and would like some information on establishing a machine hour burden rate. Where we do custom work on these machines we charge \$1.35 per hour.

JOHN M. WOOD,
Treasurer,
Albany Hardware Specialty Mfg. Co.,
Albany, Wis.

• This is a difficult problem, involving many factors, such as building depreciation, power, light, heat, insurance and salaries, but not, of course, hourly wages. The biggest factor is machine depreciation. To strike an average, you might take the figures from your annual report and distribute them on a per machine basis, then divide by the total number of working hours in the year per machine. For further information, we refer you to the Machinery and Allied Products Institute, 221 North LaSalle Street, Chicago; the National Metal Trades Association, Peoples Gas Building, Chicago; and the bulletin of Dec. 1, 1941, of the National Association of Cost Accountants, 385 Madison Avenue, New York.—Ed.

CARTRIDGE CLIPS

Sir:

We contemplate the manufacture of 0.30 caliber cartridge clips. We would appreciate all the information which you could give us regarding their manufacture and where we might obtain a sample.

R. STINSON,
S.D. Co.,
Athol, Mass.

• We suggest that you get in touch with the Hartford District Ordnance Office, 95 State Street, Springfield, Mass., and with Mr. H. G. Philbrook,

Contract Distribution Manager, WPB, at the same address. Mr. Philbrook may have samples to show you.—Ed.

SPONGE IRON

Sir:

It seems to me that in your editorial and the article on sponge iron in the July 23 issue, the age of the process was not emphasized strongly enough. It must be remembered that since the inhabitants of our planet started to make iron from the ore, they won their iron in sponge form and, of course, hammered it down into fagots for further welding and rehammering. The first "blueprint" illustrating this process can be seen on the tombs related to the time of Pharaoh Thothmes IV (Eighteenth Dynasty 1420-1411 B. C.). All iron made from time immemorial up to the beginning of the 14th Century was won from ores in the form of a sponge.

The history of the evolution of a forge-crucible into a blast furnace is very important for the present discussion, but for brevity's sake I will omit it and state only that in the 15th Century blast furnaces up 14 feet high already presented competition to the sponge iron bloomery.

The experience of many centuries and common sense of human beings, together with technology and science, have brought the iron industry to the position it now occupies on the basis of the blast furnace process.

FEODORE F. FOSS,
Wheeling Steel Corp.,
Wheeling, W. Va.

SCRAP VALUES

Sir:

We are interested in the article by L. P. Tarasob entitled "How To Identify Alloy Steel Scrap" in your April 16 issue. This is listed as number four of a series of articles designed to aid industry obtain the utmost value from every pound of metal. Do you have the references for the complete series?

G. DONAHUE,
Western Electric Co.,
Kearny, N. J.

• The three other articles appeared March 26, p. 56; June 4, p. 54; and June 29, p. 41.—Ed.

SPINNING TOOLS

Sir:

There are certain tools shown in the cuts with the article "Industrial Metal Spinning" in the July 16 issue. We would like to know where the particular tools can be obtained.

RALPH KEARNEY,
Philadelphia

• We understand that Mr. Young either makes up all his own tools or has a local machine shop make them to his drawings.—Ed.

After the Portage

AMERICAN industry has made short work of its portage from peacetime to war production . . . has sped over the intervening obstacles and finds itself again making record time on navigable waters. The building of ships, planes, tanks, guns . . . all the materials of war . . . has reached desirable proportions—and, every day, each sustained industrial effort is counting for still more and more headway.

Here at Transue, the extensive experience in, and facilities for, both the design and production of steel stampings have proved of great advantage in turning the important services of pressed steel to the vital needs of today. And so it has been in practically every industry—advantages inherent with American industrial organization have greatly facilitated the success of the war production effort. Thus it is that Transue looks to the eventual portage back to peacetime production with absolute optimism. The industrial forces which have made today's accomplishments possible are more than equal to any and all problems which may stand in the way of a brighter-than-ever tomorrow.

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This Industrial Week . . .

- **Materials Distribution Setup Faltering**
- **WPB Strives to Restore Better Balance**
- **16,000,000 Tons Tied Up in Inventories**
- **Electric Furnace Alloy Steel Tighter**
- **Priorities Changes Still Numerous**

AFTER throbbing along for eight war months at an astonishing speed, despite maladjustments, the U. S. armament producing machine is encountering sharp turns. Overshadowing all recent developments, from the standpoint of the metal producing and consuming industries, is the wavering of the materials distribution setup, which has been out of balance ever since the war began.

It is difficult in wartime, when demands are so changeable, to coordinate schedules all along the line so that the proper part or material is in the right place at just the proper time, and it is almost impossible under the badly confused current U. S. setup which has resulted from constantly altering the rules of procedure and jumping preference ratings at a dizzy rate.

The number of complaints from war plants that report they are on the verge of shutting down has been increasing in the past few weeks. WPB frantically is attempting to restore order. The WPB has long appreciated the need for better balance but apparently did not realize the thinness of supply lines to certain plants and the length of time required before procedural changes are understood and accomplished. The trend toward centralized scheduling, the approval of the elimination of overtime, and the extending of delivery dates on Lend-Lease orders are among recent moves designed to bolster the production picture. Perhaps even the warrant system may be installed eventually as a priority measure.

OFTEN steelmakers or other metal producers have been blamed for the many incompleting war machines and the layoffs, when in reality the reason was lack of auxiliary equipment, the small but vital items which must be installed before a plane, tank or ship can function. The problem of timing the flow of assemblies and raw materials is so big that careless treatment of delivery dates often is impossible to track down, but WPB in the future will put teeth into the authority it has to enforce observance of specified shipping dates.

The exact amount of steel which will be needed in the last half of this year for Army, Navy and Lend-Lease accounts is unknown at the moment, but it will be less than the astonishingly high figure which was computed a few weeks ago in Washington. Lend-

Lease delivery dates have been pushed back, instead of outright cancellation of the orders, thereby reducing the requirements of each mill by about 20 per cent for this month and until further notice. The curtailment was largely in semi-finished steel, with most of the finished steel scheduled to be shipped as originally planned.

The best figure available at Washington on the extent of inventories of steel is 16 million tons, in plants of all types over the nation. Much of this material is not usable. Checking into the matter, authorities have been amazed at the large size of the stocks held by some small companies. It is a mystery how some of the firms ever obtained the steel.

As matters stood at the start of this week, the widely heralded realignment between the WPB and the Army-Navy Munitions Board was still on paper, where it has been for at least six months. Several recent orders and interpretations indicate that WPB is not extending its control into the realm of ANMB matters as expected after last week's announcement.

THE electric furnace alloy steel situation is rapidly growing tighter and tighter, and more recognition of substitute alloy steels such as the new National Emergency grades will be forced upon military authorities. The electric furnace situation never has been fully appreciated for its effect on the whole steel industry. In order to obtain good scrap for electric units, open hearths are tied up refining unknown quality scrap. One company has melted in open hearths up to 16,000 tons per month just to test the analysis for electric furnaces. This saves junking the electric furnace heats in the event they should be found insufficient or too high in alloy content to meet fixed restrictions. Scrap has been hauled long distances just to get good quality for electric furnaces. And even despite the above precautions, probably more nickel is being wasted in devious ways than some countries are able to obtain from all sources, according to a responsible metallurgist.

This month, for the first time, the nickel used in some of the principal tools which industry relies on will go into other items deemed more vital by those on the driver's seat at Washington.

The copper situation is tighter but the degree is

obscured by the fact the ammunition component program has been out of joint and is being straightened out. Copper interests are seeking above all to protect their big shell case market against inroads by steel. However, the steel shell case program is getting under way slowly. Orders for sizable quantities of steel, mostly in the form of discs for large caliber cases, are being received by some mills. Steel mill laboratories are being asked to aid in the development of three different methods of making steel shell cases.

The past week produced a hopeful step in the magnesium-aluminum field when metallurgists met at an eastern plant for an exchange of ideas which will assist more firms to handle magnesium. Additional sessions will be held. Casting magnesium presents difficulties due to the nature of the metal. The supply situation in aluminum in respect to aircraft requirements is easier at the moment, and a reserve pile of sheets is reported to be on hand.

Numerous changes are coming in the steel priorities situation. A new form under the production requirements plan known as PD-25-h is reported being worked up to assist the military services in getting important combat items. Priorities Regulation No. 12 is likely to be rewritten. Material distribution control for small users of metal is under consideration. The secret processing directives, several score in number, which guide PRP operations, will be altered radically.

A MAINTENANCE and repair setup for the steel industry, which will greatly assist its operations, is in the works. Order P-69 will be cancelled and high ratings will be substituted to help steelmakers get necessary parts and materials.

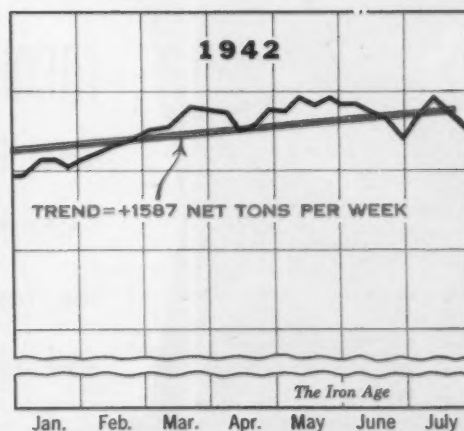
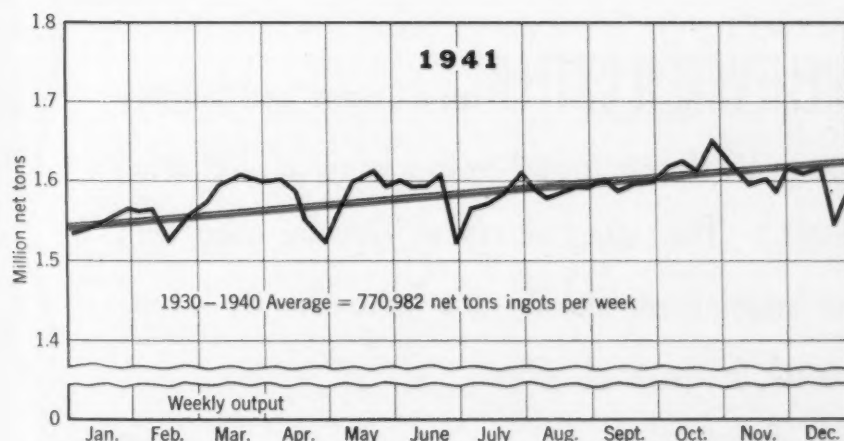
Probably the biggest headache to the steel industry and its customers is the end use system. In desperation, some plants are beginning to ignore it. The faulty arithmetic which some government priority experts objected to when the plan first was proposed, is creeping in and threatening to create false pictures of the materials situation.

Among the Week's Production Reports

Machine tools shipped in June, 26,600 units. Naval ship construction up 360% over a year ago. Lend-lease shipments now 12% of U. S. military output. U. S. merchant shipbuilding in July, 71 vessels. Steel production this week, 1,639,200 net tons. "But the biggest part of the job is still ahead."—Donald M. Nelson.

The railroad freight car program continues to be uncertain, and at present there has been no official approval for the industry to receive materials for about 4000 freight cars of the 63,000 originally allowed for construction for 1942. It is reported that approximately 44,000 freight cars have been delivered thus far this year, and 15,000 other cars are in various stages of construction. Observers say that there are tentative plans to allow the industry 80,000 freight cars for 1943, for Class I railroads not including Army and Navy needs. However, this figure may probably be curtailed in the opinion of some experts watching actions at Washington, despite the fact that over 40 per cent of the freight cars now in use are more than 25 years old. It is pointed out that these cars are being used under great pressure, and that the greatest need exists for hoppers, gondolas, and flats. Railroad men emphasize that carloading figures do not tell the story of the intensive use of railroad equipment, in view of the fact that most of the freight moving today is for longer hauls and the average l.c.l. car carries more freight than in pre-war days.

THE steel ingot rate calculated by THE IRON AGE is down one point to 97.3 per cent, apparently due to a combination of circumstances, such as the scrap situation and the need for repairs. As outlined in an article in this issue titled "Foreign Solutions for Scrap Deficiencies," the scrap supply program is not new to many foreign countries, where different technical methods have been adopted to circumvent the scrap deficiency.



**Steel Ingot Production
by Districts,
Per Cent of Capacity**

	Pitts- burgh	Chi- cago	Youngs- town	Phila- delphia	Cleve- land	Buf- falo	Wheel- ing	South Ohio	De- troit	S.Ohio River	West Louis	St. Louis	East gate	Aggre- gate
Week of July 30.	97.0	100.5	99.0	92.0	93.0*	108.5	88.0	97.0	108.1	100.0	102.0	108.0	93.9	98.3
Week of August 6.	96.0	100.0	96.0	91.0	100.5	104.5	86.0	97.0	101.4	101.0	102.0	111.0	90.0	97.3
* Revised														



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WE FLY THE ALL NAVY "E"

FORM RELIEVING A CUTTER on a Lodge and Shipley Tool Room Lathe equipped with Universal Relieving Attachment. This attachment can also be used with the taper attachment, making this lathe "handy", fast, and accurate in the tool room.

THE LODGE & SHIPLEY MACHINE TOOL CO.
CINCINNATI, OHIO, U.S.A.

War Hastens Research on Low Grade Iron-Bearing Rock

••• Greater use of the low grade iron-bearing rock known as taconite will be a necessity hastened by the war, according to responsible surveys just completed by private interests who studied reserves of high grade ore in the Lake Superior region.

Little has been said publicly, but in recent months much thought has centered on the subject of the necessity for learning to concentrate profitably Class 3 iron bearing rock. The blue chip Lake Superior ores are moving into consumption at a fast clip. Surveys show some companies' reserves at only 4½ to 7 years, with probably the largest reserve being around 20 years' supply.

The pressure on the Lake Superior region at present for as much ore as can possibly be mined, is terrific. As everyone knows, ore shipments from South America have dwindled. At the same time new requirements for ore are coming in steadily through the opening of new blast furnaces and open hearths. Somewhere between 5 and 10 million tons additional will be required in a year or two, above the 90 to 100 million tons' current requirements. Iron mines are being developed in the Eastern States, in Texas, Southern California and Utah. Probably in another year new properties capable of producing 3 million tons will have been developed in the East alone.

But the big trend which will have to come eventually, in the opinion of experts, is widespread use of the almost limitless supply of taconite, which consists highly of silica in contrast to high grade ores where the silica has leached out. This iron-bearing rock has been concentrated into good ore but not profitably. The cost of development work is high, and ore companies are restrained by the fact that ore prices are frozen.

In a limited way, research is going on, however. One ore company this year opened a laboratory with expert personnel. The fact that England has been using even leaner ores than the 30 per cent iron yielded by taconite rock of the U. S. has spurred the research. The English ore, however, is self

fluxing which is very advantageous.

Seeking to find methods for using low grade ore of Upper Michigan, Ford Motor Co. experts recently came out in favor of an electrolytic method for producing iron powder. A pilot plant will be erected at the Rouge plant.

Consumption of Lake Superior iron ore set a record in June, with the daily average hitting a new top of 234,444 gross tons, according to the Lake Superior Iron Ore Association. The previous record was 233,541 tons average daily consumption, set in May.

News of Industry

The total for June was 7,043,434 gross tons, which was slightly lower than the May total of 7,239,788 gross tons, since June is a shorter month.

Improved Setup Advocated To Obviate Needless Hauling

Cleveland

••• Transportation facilities might be relieved of a substantial tonnage of freight, in the opinion of an industrial observer here, if Federal authorities arranged for forge plants to clip off the open end of shell forgings and to rough turn the forgings before sending them to shell plants to be finished.

It is estimated that in many cases approximately 50 per cent of the steel contained in a shell forging is converted into scrap by clipping the open end and then turning the shell into the finished

product. Of this scrap the bulk by far is the four or five inches open end clipped off the shell and the rough turning.

Thus, some four plants in this area turning out 250 shells a day of a certain size would produce about 62 tons of scrap each, for a total of 248 tons a day. It is pointed out that in view of the nature of turnings, trucks probably could only carry about two tons at one load. Thus, either trucking or transportation by railroad cars of this scrap to a scrap dealer or to a steel mill is a rather sizable freight problem. Yet, this scrap is transported an additional time when the forge plant ships its forgings to the shell plant which may be located a few hundred miles away.

It is reported that the Colorado Fuel & Iron Co., and the Omaha Steel Co. are operating on a basis where Colorado Fuel, which makes the forgings, clips the open ends and does the rough turning at its plant, afterwards ships the shell for finishing to Omaha Steel. Informed observers here believe that it might well behoove Federal authorities to rearrange outstanding shell contracts so that shell lathes could be installed at or near the forge plants to do the necessary rough turning, and to make allowance for clipping the open end of the shell right at the forge plant.

12% of War Products Being Moved by Trucks

••• Twelve per cent of the weekly tonnage shipments of war products from midwest plants is being moved by trucks, says Brig. Gen. Donald Armstrong, Chicago Ordnance District chief. Truck shipments are now averaging well over 325 loads a week, this figure representing an increase of 900 per cent during the past three months, Armstrong said. Several midwest concerns have converted their automobile truck-a-way trailers into carriers for gun carriages and limbers. They have also devised special packing arrangements for the moving of shell casings by truck.

Truman Committee Eager to Probe Sponge Iron Situation

Washington

• • • The Truman Senate Committee was scheduled to begin the steel "investigation" today, Aug. 6, and to start off with plates. Committee representatives have been gathering material which will be used as the basis for a comprehensive inquiry into the steel situation.

Despite volumes of factual material showing the impracticability of attempting to build up a sponge iron process to make scrap, this subject will receive major attention and considerable data designed to bolster plans for establishing furnaces at ore mines in the Middle and Far West are said to have been compiled for the committee. One plan is said to contemplate the development of a sponge iron plant with 1000 tons daily capacity in the iron mountain district of southern Missouri, the state from which the chairman of the committee hails.

The steel hearings will be held before a subcommittee, headed by Senator Mead of New York, Administration candidate for governor of the Empire State.

The duration of the hearings probably will be extensive, broken up in two and three-day sessions, with witnesses for the committee, and from the steel industry and the WPB testifying. Among the latter probably will be Chairman Nelson who recently told the committee that one difficulty in the steel problem has to do with inventories.

"We have got to prevent excess inventories from piling up in the system," said Mr. Nelson. "In other words, having one shipyard have more steel plate than it can use in the next two months or 45 days—whatever the amount of time is necessary for backlog—and another company which is producing rapidly, having none. Maldistribution, of course, brings an unnecessary shortage. We have gone into it and we have evidence of it in every phase of a lot of maldistribution in every material; too much built up in this pile, too much in that pile, too much in the use of another."

The piling up of inventories re-

ceived brief attention from a subcommittee of the House Committee on Merchant Marine and Fisheries, which said that there is no steel shortage but that the lack of steel at some yards was due to high inventories in other yards. In

making this report the subcommittee agreed with Andrew J. Higgins, head of the Shipbuilding Corp., New Orleans, who had told the committee that the Maritime Commission's order stopping construction in his yard was not due to a shortage of steel as the commission had said. He said that there was plenty of steel but that some yards had piled up excess inventories.

High Speed Steel Producers Reduce Schedules for August

• • • After building up to an unprecedented production peak, makers of high speed steel have run into an obstacle which necessitates slashing their schedules for August. Shipments this month will not be affected, but deliveries in September and later months this year will suffer.

Apparently the move is part of the plan to put war production into better balance. The alloy situation has been getting tighter and tighter. Little or no nickel will be allowed for the production of tool steels in August.

Most makers of high speed steel are understood to be cutting pro-

duction of each grade at least 25 per cent during August from the amount shown on the PD-440 melting schedule for August. The cutting is not being done through any whim of the producers, but upon orders issued at Washington after analysis of the whole situation showed the existence of a serious condition. Wherever possible, customers are being consulted and asked what they can forego.

Meanwhile, demand for high speed steel for war production is reported actually increasing above the record levels which have featured recent months. Producers fear that the 25 per cent cut in output will create an almost impossible situation and that they will be under pressure from all sides to assist hard pressed customers.

The tool steel industry for some time has been attempting to persuade Washington to revamp some of the requirements forced upon producers when makers of tonnage carbon steels were brought under closer governmental control. They have been hoping that Washington would recognize a proposed setup that would establish a differentiation between requirements for purchasing high alloy tool steels such as high speed steels, hot work steels, high carbon-high chrome die steels, from the so-called low alloy tool steels having less than 1½ per cent total added alloy content.

A new administrative order on tool steels, separating them from the tonnage products covered by M-21 and the constructional alloys as covered by M-21-a is necessary,

Armco Builds Alloy Plant from "Scrap"

• • • What is believed to be the lowest cost alloy steel plant ever built was dedicated last Wednesday, after being in operation since June 1. The plant, a unit of American Rolling Mill Co., Middletown, Ohio, was assembled from "scrap" scattered over three cities.

From South Charleston, W. Va., came three electric furnaces, relics of a World War I naval ordnance plant. In Cincinnati a used building, equipped with two overhead cranes, was purchased to house the three furnaces. In Middletown, the "scrap" was assembled, and an old charging machine rebuilt. The only new equipment in the plant, WPB said, consists of electric transformers.

Less than seven months after the Defense Plant Corp. contract was signed, the plant was turning out propeller blade steel.

in the opinion of trade authorities.

Like the rest of the steel industry, tool steel makers have had great difficulty breaking down orders in conformity with the end-use system. On some small orders intended for six or eight different end uses, as many as 100 punched cards have been required.

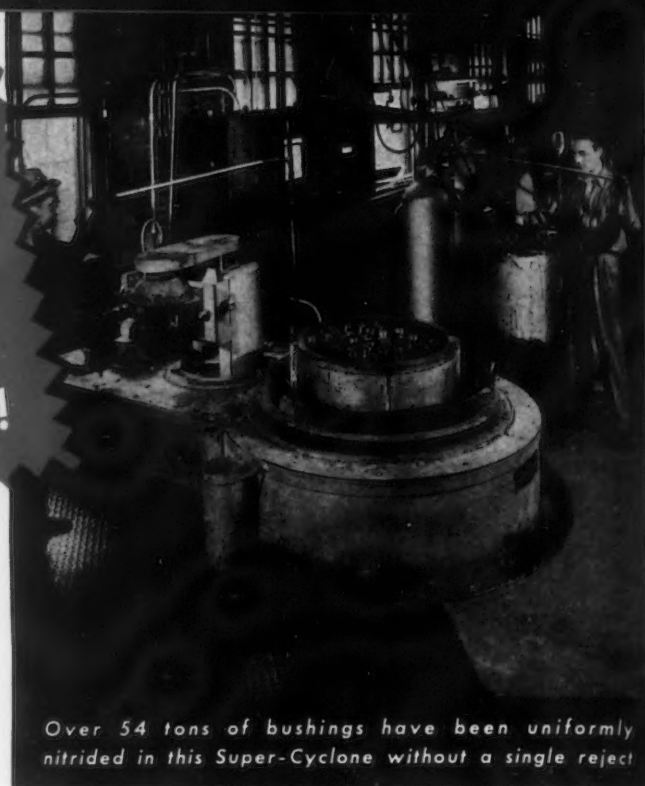
An informal request has been entered on behalf of the entire steel industry to ease the burden of paper work under the new end use reporting system. It has been pointed out that the same information can be obtained through analysis of two reports now being submitted—AIS-16 which lists shipments by consuming industries, and PD-138 which reports shipments of products by preference ratings and groups. In addition, several changes may be required in PD-25-a.

So far, the steel industry's recommendations in regard to the excessive work created under the new setup, have not stirred much action at Washington. The steel industry's stand has been backed up by some governmental officials who opposed the new classification plan and feared that the faulty arithmetic which was liable to occur might easily create a false picture of needs.

Canadian producers and consumers of high speed steel have been ordered to introduce certain changes in their manufacturing practices with a view to conserving Canada's diminishing supply of tungsten, molybdenum and vanadium, Department of Munitions and Supply announced. The new order by F. B. Kilbourn, Steel Controller, defines two classes of high speed steel affected. Class "A" includes all alloy steel containing not less than 0.55 per cent carbon, more than 3 per cent molybdenum and 7 per cent or less tungsten. Class "B" includes alloy steels having not less than 0.50 per cent carbon and containing more than 12 per cent tungsten. The amount of Class "B" high speed steel which can be obtained for use during any quarter must not exceed one-third of the quantity in weight of Class "A" high speed steel received during the same period. Demand for the valuable Class "B" will be reduced. In addition Class "B" must not be used for any purpose which might reasonably be satisfied by Class "A."



ARMY ANSWER TO KAISER: The sensation of Henry J. Kaiser's giant cargo plane proposal hastened release of these photos of the Army's new Curtiss "Commando" transport. To Mr. Kaiser's right an infantry unit with three "peeps" prepares to board the craft, which weighs 50,000 lb. fully loaded. It has a wingspan of 108 ft. and is powered by two 2000 hp. radial engines. It is officially designated as the C-46.



Over 54 tons of bushings have been uniformly nitrided in this Super-Cyclone without a single reject

A SUPER-CYCLONE is nitriding 3450 pound loads of bushings with uniform case and hardness in a large manufacturing plant in the Middle West. The bushings are $3\frac{1}{4}$ " to $4\frac{1}{2}$ " in length and $1\frac{3}{4}$ " to 3" inside diameter, with a maximum section of $\frac{1}{4}$ ".

A load of 1350 of the bushings are placed in a basket and charged into the retort of the Super-Cyclone where they are uniformly heated in ammonia gas for 72 hours at approximately 980°F. The parts have a .032" to .034" case depth and are never more than .002" out of round.

These results have been consistent since the Super-Cyclone's installation and to date over 50,000 of these bushings, more than 54 tons, have been nitrided *without a single reject!*

BUT WHY USE THE SUPER-CYCLONE?

Why not a low-temperature standard



Uniformly nitrided, this typical load of bushings has just been removed from the Super-Cyclone.

type nitriding furnace? The answer is that the same uniform job of nitriding could be handled in the Standard Cyclone Nitriding Furnace which has a top temperature of 1250°F., but this manufacturer, in obtaining the Super-Cyclone, looked further ahead than the job in hand.

In connection with the nitriding work, he can "cure" or denitride the retort by taking advantage of the high temperature range of the Super-Cyclone and, with the retort in the furnace, run the heat up to 1600°F.

A companion Super-Cyclone in the same plant is now employed for production hardening. After the nitriding job has been discontinued, he will have two 100% forced convection heated furnaces with temperatures from 250°F. to 1750°F. for hardening, annealing, normalizing, tempering, or any other heat treating operation which falls within that range.

MANY ADVANTAGES

The Super-Cyclone, with its 100% forced convection heating principle and its wide temperature range, offers a variety of uses. In addition, it increases production through rapid, uniform heating of heavy loads, eliminates distortion due to uneven heating, reduces handling of material by employing a fixture to carry loads through all heating and quenching operations, and requires less floor space than conven-

tional equipment to bring all these advantages.

Write for Bulletin 130. It gives more complete information on material handling, furnace operation, economy of floor space, sizes available and ways to figure Super-Cyclone production possibilities in your own shop.



MOVIE

Write now to reserve a date for Fall and Winter showings of the full length sound and color Heat Treating Hints movie. Loaned without charge, this film shows actual heat treating operations going on with the editors of Heat Treating Hints at their furnaces, quench tanks and straightening presses. Each operation is thoroughly explained to the satisfaction of the greenest trainee. The film is purely educational and contains no advertising.

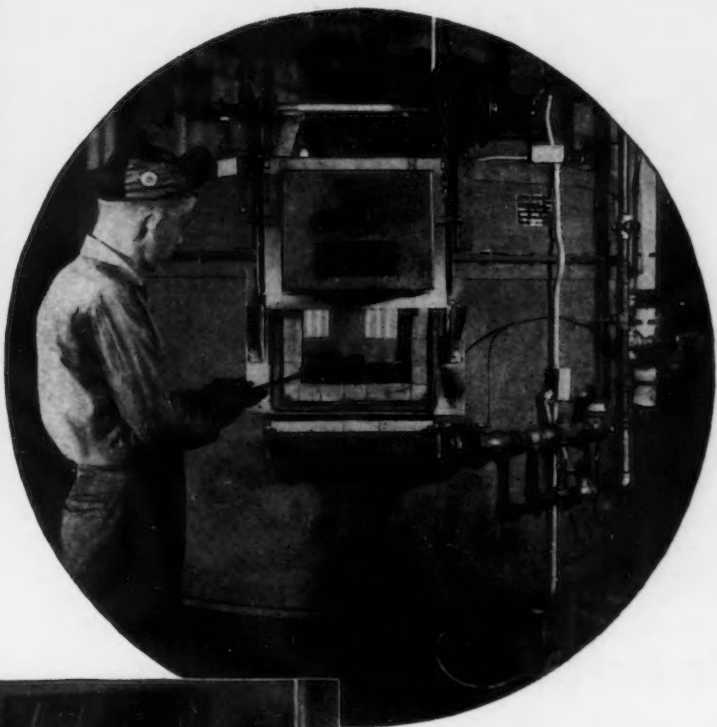
For your coming plant or chapter activities, may we suggest that you send today for the pamphlet giving complete instructions on how to arrange for the Heat Treating Hints movie.

LINDBERG ENGINEERING COMPANY

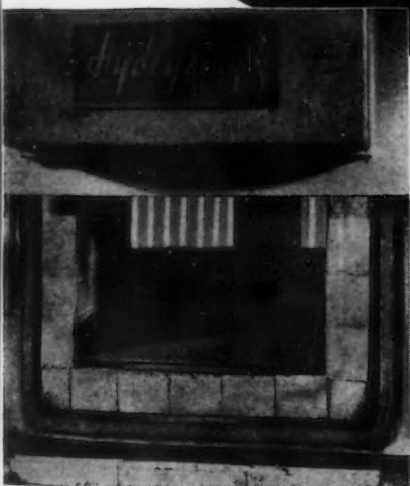
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LINDBERG FURNACES

CONTINUOUS AND CONSISTENT PRODUCTION FROM THE ROTARY HEARTH FURNACE



ABOVE: Every 3 minutes, 9 uniformly heated tool shanks are removed from this Rotary Hearth Furnace and 9 cold ones placed on the hearth, thus, setting up a steady production flow.



LEFT: A view into the work chamber showing elements, hearth, 9 pieces started on their 30 minute heating cycle, and the protective vestibule plate which prevents chipping of the refractory at the chamber opening. At the bottom of photo is the outside flame curtain burner. The flame is transparent blue and consequently does not photograph.

ADVANTAGES OF THE ROTARY HEARTH

The application of the Rotary Hearth Furnace to this tool shank job is typical of its value in the shop where production hardening of parts, having similar weights and sections, is too great or inconsistent from a number of box furnaces and yet not large enough to justify a conveyor belt furnace.

The Rotary Hearth is, in principle, a small continuous type furnace with the advantage of requiring only one operator for loading and unloading from the same opening. The work is heated accurately on the revolving hearth by Lindberg Tubulaire elements that provide uniform heating throughout the work chamber and the fact that the speed of the hearth can be regulated



**HEAT
TREATING
HINTS
FREE!**

Whether the war has brought you into contact with heat treating for the first time or whether you have devoted a lifetime to it, Heat Treating Hints published without charge for heat treaters, offers you valuable "how-to-do-it" information on heating, quenching, straightening, etc.

In the third year of its publication, Heat Treating Hints is read and used by over 8000 heat treaters and metallurgists from coast to coast. Your written request will bring you the latest copy and will place your name on the mailing list for future issues. Write today.

to meet the heating needs of the steel, assures you of consistent production.

CLEAN HARDENING

When used with the well known Lindberg Hydryzing Process, the Rotary Hearth Furnace is ideal for the production hardening of scale-free, decarb-free and carburization-free machined parts. The neutral, controlled Hydryzing atmosphere turns out clean work that is full hard right on the surface and, being free of decarb, costly grinding, stoning or polishing operations are eliminated. The prevention of carburization lengthens tool and die life by giving a tough, hard surface that is free from cracking and chipping.

Lindberg Rotary Hearth Furnaces today are turning out gun parts, aircraft engine parts, ammunition dies, detachable rock bits, chisels, tools and dies, and filling the awkward spot in heat treating departments where the production of similar type work cannot be conveniently handled in box furnaces.

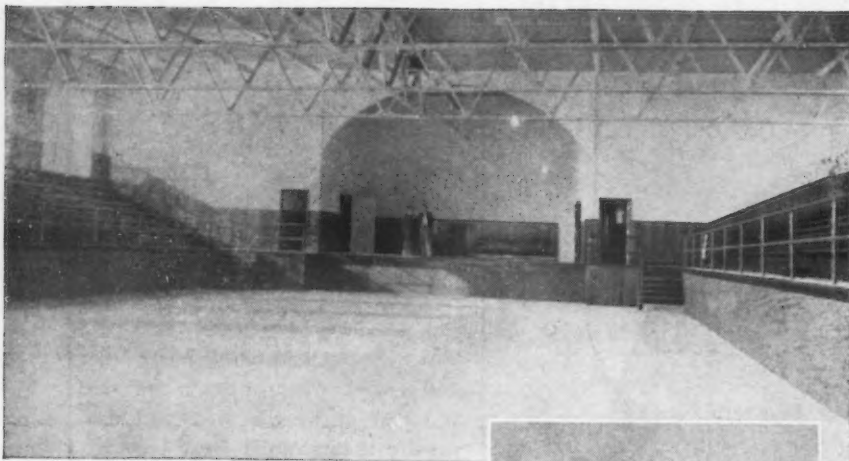
If you are confronted with this problem, write today and a competent Lindberg sales engineer will be glad to work it out with you.

Every 3 minutes, day after day, nine 18 ounce tool shanks of alloy chisel steel are removed from a Lindberg Rotary Hearth Hydryzing Furnace, quenched in oil and nine cold shanks placed in the furnace. Thus, a steady production flow is set up—180 pieces per hour of scale-free, decarb-free and carburization-free work; over 200 lbs. of tool shanks per hour are uniformly heated and quenched with a resultant hardness of 58-60 Rockwell "C". They are then tempered in a Lindberg Cyclone Tempering Furnace for 1½ hours at 875°F.

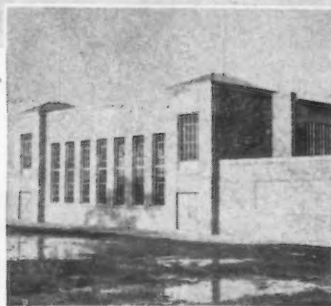
CYCLONE FOR LOW-COST ACCURATE TEMPERING

SUPER-CYCLONE FOR HARDENING, ANNEALING, NORMALIZING, TEMPERING, NITRIDING

HYDRYZING FOR SCALE-FREE AND DECARB-FREE HARDENING



National Guard Armory,
Maryville, Tenn.



★ **NATIONAL**

GUARD ARMORY insulated

with **Carey**
ROCK WOOL

★ In planning the modern and efficient National Guard Armory at Maryville, Tennessee, the architects, Fred Manley Associates, Knoxville, Tenn., specified installation of Carey Rock Wool above the ceilings, about two carloads of this product being used for the purpose. Carey Rock Wool was selected for this job because of its known efficiency and dependability.

Tests by a number of leading research organizations certify to the high quality of Carey Rock Wool. You insure maximum desirable results when you specify CAREY Insulations. See Catalog in Sweets or write for full information. Address Dept. 26.

THE PHILIP CAREY MFG. COMPANY

DEPENDABLE PRODUCTS SINCE 1873

LOCKLAND, CINCINNATI, OHIO

In Canada: The Philip
Carey Company, Ltd.
Office and Factory: Len-
noxville, P. Q.

1500 German Patents, Two Japanese Firms Taken by U. S.

• • • Among properties taken over by the Alien Property Custodian, as announced July 27, were:

More than 1500 patents, all German-owned, in the fields of radio, television, chemicals, and aircraft propellers.

All of the common stock of Ufa Films, Inc., American distributing agency for German-made Ufa films.

All assets of the New York branch of Hara & Co., a trading company with headquarters at Yokohama.

The entire capital stock of Ataka & Co., Inc., a New York corporation formerly engaged in the export of machine tools and optical instruments to Japan. The company, which is now in liquidation, still has a small inventory which may be useful in the war effort.

Steel Inventories Called Unwieldy in Some War Plants

Pittsburgh

• • • The mysteries of the adequacy or inadequacy of our steel supply to meet our own and our allies' war needs were further intensified this week with reports that one plant phoned its supplier asking that shipments be immediately suspended since inventories are becoming unwieldy, while another plant had built up such a large backlog of material that its supplier, on his own initiative, began to divert steel to other more needy plants, although the overstocked unit had been directed to receive additional tonnage by Washington. These cases contrast with the predicament of other concerns which have been forced to slacken production due to lack of steel.

To Cut Absences, Thompson Workers Get Tenth Day Off

Cleveland

• • • To curtail absences the Thompson Aircraft Products Co. will give each of its 6000 workers every tenth day off. Stacy R. Black, personnel manager, pointed out that employees had been working three 8-hour shifts seven days a week. He said that about 500 workers would be required to fill in for employees taking their off days.



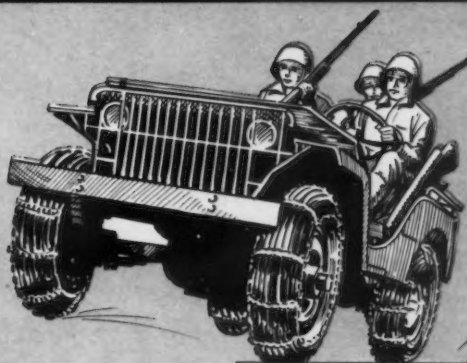
ENGINE ASSEMBLY: A graphic illustration of the fact that even training planes are not a simple assembly job is this view of a Canadian worker putting the finishing touches to the engine assembly of a Canadian-built Harvard trainer.

WPB Halts Priorities Suit Against Carnegie-Illinois

••• The threat of involved litigation by the WPB against Carnegie-Illinois Steel Corp. for violation of priorities orders, a charge steadfastly denied by Carnegie-Illinois, was ended last week with a stipulation filed in United States district court at Newark. Under the stipulation, WPB states that it does not and has not at any time intended to charge the company or its employees with lack of patriotism, and the company agrees to abide by WPB orders and regulations. J. Lester Perry, Carnegie's president, said the company stands upon its previously filed answer, and continues to deny it had violated WPB orders.

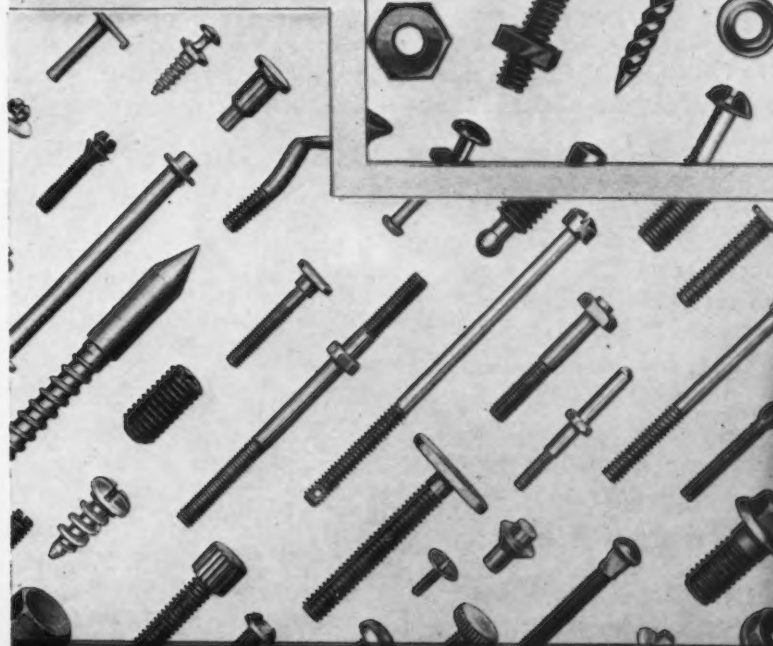
Amphibian Tanks in Production Detroit

••• Amphibian tanks are in production at the Graham Paige Motors Corp. plant in Detroit it has been announced by the Navy Department. The tank is heavily armored and can be operated in water, swamp and over rough land.



MIGHTY MIDGETS

Like the speedy, rugged, indispensable "Jeep" and other mighty midgets of war, HOLTITE Screws, Bolts and allied fastenings are called upon to do jobs far out of proportion to their size. With strength beyond ordinary demands, HOLTITE time-tested fastenings can be used in any assembly with full assurance of faultless, enduring performance. Specify them on your next order.



SPECIAL

We have the most completely equipped plant for the production of special parts and fastenings. Specials of any kind can be produced on order. Precision is assured. Send specifications, sample or blueprint.

CONTINENTAL SCREW COMPANY

New Bedford, Mass., U.S.A. Warehouse - Detroit, Mich.

Latin American Quarterly Preference List Announced

Washington

••• A new list of materials for which Latin American orders will be given preference over all other orders, regardless of ratings during the third quarter, was issued last week by the WPB director general for operations, as amendment No. 2 to general exports order M-148.

Among the products which are in addition to a similar list announced May 12, are: mercury, platinum, zinc, diamond dies (non-strategic), bauxite, beryl and beryllium, cadmium (metallic). The following are among products which were on the previous list and which have been removed: tungsten, soda ash, tanning materials (chrome), rubber, manila fiber and cordage, light trucks, cranes, hoists, derricks, household refrigerators, cobalt (oxide), molybdenum wire, caustic soda, tricresyl phosphate, small electrical heating appliances.

St. Louis Stoker Sales Decline

St. Louis

••• A total of 1406 stokers was installed here in the first six months of this year, compared with 1981 in the corresponding period last year and 890 in the first half of 1940.

Ordnance Field Offices Streamline Procurement

••• Field offices have been set up to coordinate and direct the activities of ammunition plants which are government-owned but contractor-operated. The Ordnance Department expects to speed up the inspection and testing of material. A field director will be located in St. Louis. The production section, small arms branch and the gage section of the office of the chief of ordnance have been transferred from Washington to Philadelphia.

WPB Anticipates Drive For Crucible Scrap Materials

••• The materials division of WPB has asked users of graphite crucibles to segregate and save their crucible scrap in anticipation of a collection drive.

Crucible scrap contains a considerable proportion of graphite and silicon carbide which is strategic material soon to come under a conservation and reclamation program. Users of crucibles are asked to separate Tercod and Syncarb scrap from other scrap and store for future collection.

Presumably, central processing stations will be provided after present investigations of equipment and methods have been completed. Further information is promised.

Murray Corp. Employment to Drop Little "Between Models"

Detroit

••• Due to increased production schedule on Consolidated bomber parts and acceleration of preparatory work for the Thunderbolt pursuit plane, which will replace the light attack bomber contract now expiring, new figures released by the Murray Corp. of America minimize the impending "between-models" drop in employment figures and forecast an increase in employee rosters for next year. The Murray employment figures will reach an ebb in October when payrolls will be 8 per cent lower than in June. An upward swing will then set in, with December registering more workers than June, and this trend is expected to continue until May, 1943, at which time there will be 50.7 per cent more workers on Murray payrolls than in June, 1942.

Westinghouse Workers Honored with Blue Flag

••• The blue "Minute Man" flag symbolic of outstanding war bond purchases, was awarded recently to the East Pittsburgh divisions of the Westinghouse Electric & Mfg. Co., where employees are buying war bonds at the rate of \$6,000,000 a year.

Steel Companies Issue Quarterly Earnings Statement

••• The impact of proposed heavier Federal taxes is reflected in the balance sheets filed by steel producers for the second quarter of 1942. In some cases provision had to be made for substantial increases retroactive to Feb. 6 by the recent decision of the WLB. In the case of Bethlehem this amounted to approximately \$5,600,000. Substantially increased billings are reflected in all statements but the Bethlehem report, which includes subsidiary companies, stands out as the only one on the list to show a higher profit in this quarter as compared with the corresponding period of 1941.

Company	Second Quarter 1942		First Half 1942		Second Quarter 1941	
	Net Income	Per Common Share	Net Income	Per Common Share	Net Income	Per Common Share
U. S. Steel Corp.	\$18,764,423*	\$1.43	\$33,866,907	\$2.44	\$24,814,751	\$2.12
Bethlehem Steel Corp.	6,070,913	1.49	12,211,601	....	5,651,457	1.34
Republic Steel Corp.	3,355,158	....	8,072,120	....	5,428,748	....
National Steel Corp.	2,750,445	1.25	5,426,282	2.46	4,291,430	1.95
Jones & Laughlin Steel Corp.	2,438,752	1.42	4,930,470	2.88	3,937,720	2.62
Inland Steel Co.	2,367,391†	1.45	4,895,481	....	4,102,572	2.51
Youngstown Sheet & Tube Co.	2,291,119	....	4,867,716	....	4,765,996	....
Crucible Steel Co. of America	1,457,162	2.35	2,605,285	4.01	1,554,463	....
American Rolling Mill Co. ....	....	....	3,334,323	.81	3,068,735	....
Wheeling Steel Corp.	795,558*	.60	1,995,648	1.91	2,708,187	3.96
Keystone Steel & Wire Co.**	....	....	1,796,032	2.37	538,863	....
Pittsburgh Steel Co.	731,840	....	1,377,175	....	....	....
Rustless Iron & Steel Corp. ....	....	....	640,694	....	582,762	....
Alan Wood Steel Co. ....	....	....	388,854	.69	283,266	....
Superior Steel Corp.	122,071	1.08	243,857	....	243,689	2.15

* After charging 1st quarter with additional taxes provided in 2nd quarter.

** Figure for fiscal year ending June 30.

† Not reflecting \$600,000 due in back wages payable by WLB order.

Rolling Out the Battle Wagons from New Plant

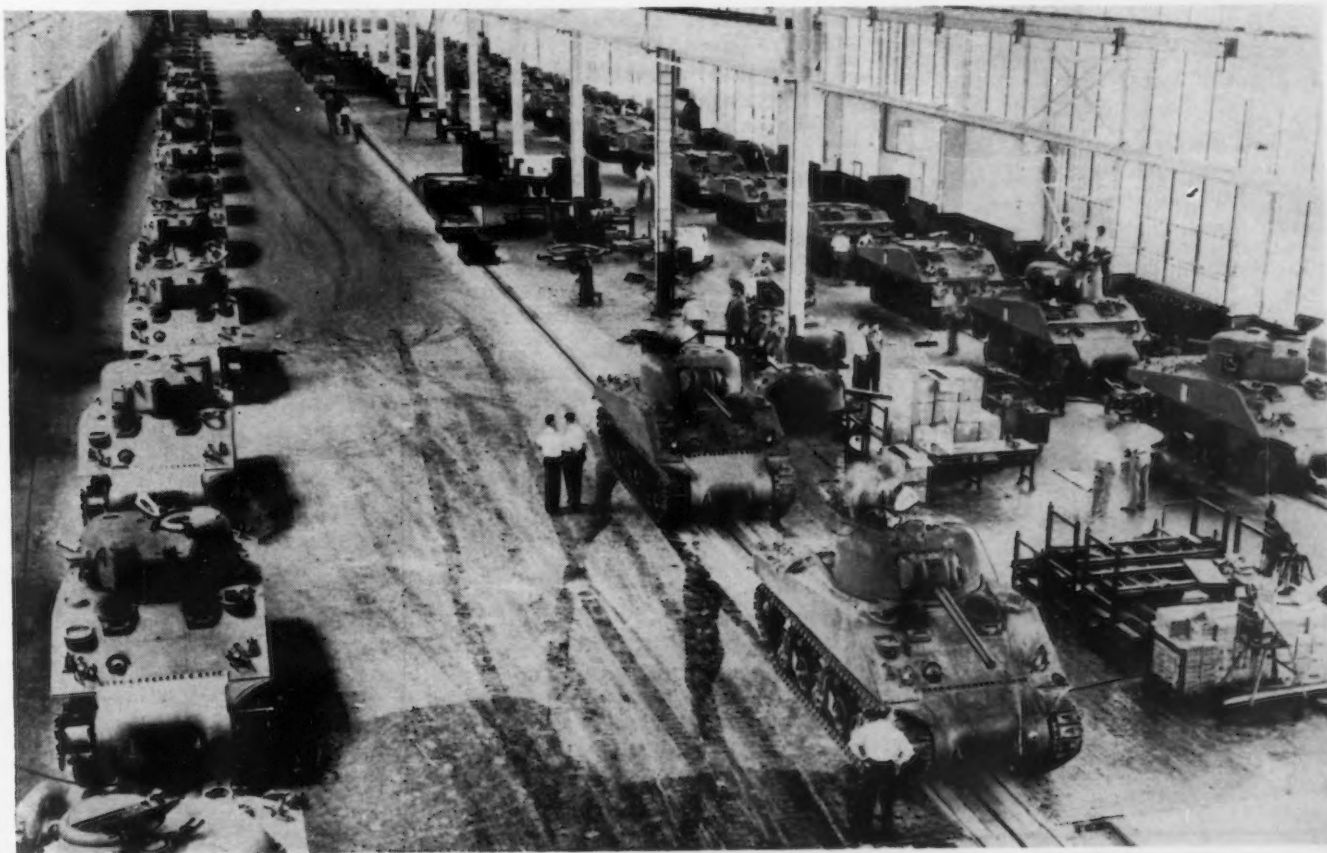


TURN-OVER FIXTURE: In the new Fisher Body plant making M-4 tanks this specially designed fixture plays a leading role. It revolves in a complete circle permitting welders always to work in a downward position. Here they are welding a rear top plate.



30-TON REVOLVING AND TILTING FIXTURE: This giant in the new Fisher Body plant is so powerful that it grips the entire tank hull and revolves it in a complete circle. It also tilts sharply lengthwise, either upward or downward.

ROLLING FARMLAND SIX MONTHS AGO: The plant was started in January and by July quantities of the newest type tank, the M-4, were being shipped, it was announced. As each tank comes off the line it is given a hard test run and then wrapped in a protective shroud and loaded on a flat car. Production was halted for this picture.



Let's Try To Avert a Serious Scrap Shortage

One year ago this company inaugurated an advertising campaign in *The Iron Age* to urge more rapid gathering and shipping of iron and steel scrap.

During that period no critical shortage has occurred, but there has been no surplus — in fact, more steel could have been produced had more scrap been available.

On July 20th a national salvage advertising campaign in newspapers, magazines, business and farm papers, sponsored by the War Production Board and financed by the iron and steel and other interested industries, was launched.

We are cooperating in this campaign to the limit of our ability.

The steel and scrap industries are well aware that by Winter or earlier steel output may suffer serious curtailment unless new sources of scrap are uncovered. This is no cry of "Wolf" but a situation that demands patriotic action by every citizen and by every industrial plant.

Steel shortages may hamper our war effort unless millions of tons of additional scrap are brought to market.

The **CHARLES DREIFUS** Company

(Broker in Iron and Steel Scrap
for Nearly Half a Century)

Philadelphia, Pa.
Widener Bldg.
Rittenhouse 7750

Pittsburgh, Pa.
Oliver Bldg.
Atlantic 1856

Worcester, Mass.
Park Bldg.
Worcester 6-2535

Dramatic Details Revealed In Strip Mill Conversion Story

Washington

• • • Conversion of the nation's strip mills, accomplished in record time, has been widely publicized, but the dramatic details haven't been brought out to date. The background is full of interesting material.

Strip mills today are supplying about one-half of the plate production, ranging from 3/16 in. and thicker. Plate output jumped to 1,050,962 tons in June. Of this total, 489,704 tons came from strip mills.

The conversion record is extremely interesting, and factually presented gives striking evidence of the rapid swing to plate output. Conversion of strip mills to plate production really began in October, 1941. In that month these mills produced 152,440 tons of plates. The month-by-month output in net tons on strip mills since then, including the last two months of last year and the first six months of 1942 follow: November, 169,311; December, 182,604; January, 230,396; February, 268,988; March, 306,195; April, 357,519; May, 425,211, and June, 489,704.

W. Sykes, president, Inland Steel Co., said recently:

"The mills have done their part. Increased production had to be obtained by the adaptation of existing equipment to produce plates as new mills would require a year or more to build. Strip mills, not primarily designed for plate production, offered the quickest solution."

He pointed out that changes in arrangements, auxiliary equipment, and additional finishing space were required. He added that arrangements were made between companies to transfer slabs from one plant to another, regardless of cost, to achieve maximum production.

Jones & Laughlin Steel Corp., Otis Steel Div., Youngstown Sheet & Tube Co., Carnegie-Illinois Steel Corp., and Republic Steel Corp., have successfully shifted from the production of light steel to plate production and in the process have solved many problems requiring the use of heavier

equipment, the securing of additional plant space and shearing facilities.

In the Pittsburgh works of Jones & Laughlin the change-over necessitated shortening of a crane by 10 ft. for temporary duty until a new crane could be obtained. Lack of shipping space was relieved by installing an abandoned gravity conveyor so that plates could be transferred to an adjacent cold mill shipping building where

Lackawanna Mill Now Rolling 80% on Plates

Lackawanna, N. Y.

• • • Production of steel plates at the Bethlehem Steel Co. Lackawanna plant has increased to the point where approximately 80 per cent of the output of the strip mill, formerly devoted to rolling sheets, is now turning out plates. Conversion of the mill resulted in closing down the "cold mill" division and temporarily laid off employees. Many of these found jobs elsewhere in the same plant. The change-over from sheets to plates (five-eighths to one-inch thick) has been one of the most unusual mechanical readjustments made in the entire steel industry. The June plate output totaled 56,000 tons.

cranes, tracks and scales used in the production of automobile sheets could be utilized. By using the flying shear on the hot mill and cutting to approximate lengths, it was possible to transfer the lighter plates to the sheet department, where proper facilities existed.

Suggestions from operating personnel and engineering studies resulted in the installation of a home-made crop end remover and changes to the plate piler to make possible the piling of two plates at a time instead of one, eliminating delays to the main finishing line. A piler made up from unused parts of other pilers was installed on one of the runout lines, making it possible to take off plates ahead of the regular finishing line when side trimming was not necessary. Straightening equip-

SO THAT *Power* CAN ADVANCE TO VICTORY



DODGE Rolling Bearings are on 'round-the-clock Victory duty — serving at strategic points along the power roadbeds of industry — "cushioning" balky power on all types of drives — fighting off friction — delivering power without dissipation — they are towers of strength at points of wear — assuring unbroken operation for the "duration."

Dodge Rolling Bearings are designed for a life expectancy of 30,000 hours under conditions for which they are adapted. High speeds — shock loads — heavy, medium and light duty — dust

— moisture — heat — all of these service conditions are taken in stride. Their ruggedness and stamina enable them to meet today's sustained production peaks.

Depend on the Dodge Complete Line of Power Transmission equipment — bearings, couplings, clutches, sheaves, pulleys, V-belts for unfailing delivery of power on Victory production lines — depend on Dodge distributors for prompt delivery of standard products from stock and for constructive assistance in the right application of the drive to the job — depend on Dodge for "The Right Drive for Every Job."

DODGE MANUFACTURING CORPORATION, Mishawaka, Indiana, U. S. A.

DODGE

MISHAWAKA



THE RIGHT DRIVE FOR EVERY JOB



Dodge-Timken Special Duty Pillow Blocks and Unit Mounts for heavy loads and high speeds.



Dodge-Timken Clamp Sleeve Bearings... Hanger Bearings... Pillow Blocks and Unit Mounts. Rugged, and dependable general purpose bearings.



Dodge-Timken Type "C" Bearings... Hanger Bearings... Pillow Blocks and Unit Mounts with special seals to exclude the finest abrasive dust.

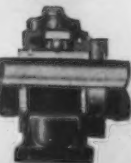
Dodge-Timken "Double Interlock" Pillow Blocks and Unit Mounts for normal radial, thrust and shock loads.



Dodge "DH" Ball Bearings — Hanger Bearings, Pillow Blocks and Unit Mounts. For high speeds and light to moderate loads.



Dodge "DH" Ironclad Ball Bearing Pillow Blocks with rugged cast iron housing for high speeds and light to moderate loads.





Greater Tonnage
Per Edge of Blade



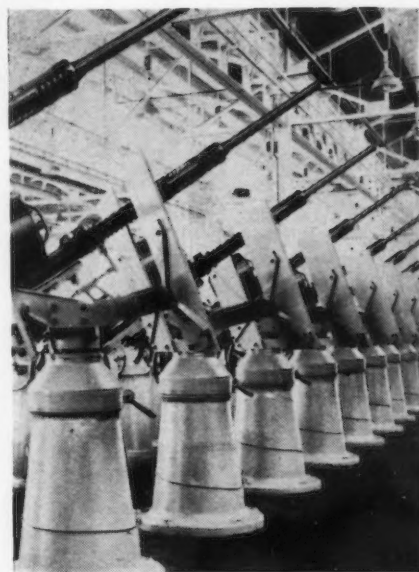
AMERICAN
SHEAR KNIFE CO.
HOMESTEAD · PENNSYLVANIA

ment has been provided with extra stiffener rolls so that heavier plates can be handled. Scrap kick-off devices, constructed by regular maintenance forces have been installed to eliminate delays, and tables lengthened to permit handling longer lengths on the lighter gage plate lines.

At the Campbell plant in Youngstown, Ohio, of the Youngstown Sheet & Tube Co., space was the factor which threatened to block the production of plate. This strip mill is built so close to other finishing plants that there is not sufficient room to build cooling tables and finishing equipment. The company solved this dilemma by shipping very hot plates six miles up the Mahoning Valley to their Brier Hill mill. In this World War I plant, finishing equipment is utilized to complete the process. Approximately 18,000 tons of heavier than $\frac{3}{8}$ in., nearly 10,000 tons lighter than $\frac{3}{8}$ in. and about 10,000 tons of light plates for the manufacturers of electrically and lap welded pipe move over this same route. The company says that if WPB would approve certain changes it hopes to increase production of plates $\frac{3}{8}$ in. and heavier by another 7000 tons.

In speaking of the job done at the Carnegie-Illinois Irvin Works at Clairton, Pa., company officials have estimated that instead of 37 days, which the company spent to change its strip facilities to produce plate, if the finishing equipment had been purchased new, time consumed would have been eight months to a year. This giant 80-in. hot strip mill of the Irvin Works is now handling plates 1 in. in thickness and 72 in. wide. Proving that no time was lost to make the needed war material, the plant in May produced 38,000 tons of plates. In June, 47,000 tons and in July from 55,000 to 60,000 tons. In converting the finishing end of the continuous hot reduction line at Irvin Works, "bits and pieces" from numerous plants were brought together, rebuilt and installed by the company's own force, enabling the work to be speeded up considerably.

In one case, an ancient steam-driven shear was coupled with an old roller-leveler, and both units reconditioned into a modern electric-driven finishing line on which



GUNS FOR SHIPS: Part of a single day's production of 20 mm. Oerlikon A.A. guns for America's merchant ships. A Naval officer recently credited guns of this type with saving a convoy worth more than the cost of the entire gun program.

a single crew now hold the record of 636.5 tons of finished plates in one 8-hr. turn. This record was accomplished by a crew recruited from other departments of the plant, now inactive, having about four weeks training on the new plate finishing unit. New finishing facilities installed to bring about conversion of Irvin Works to important plate production include a piler at the hot strip mill proper as well as at the shearing line. Plates are piled in stacks after rolling and then are placed on cooling beds until the temperature has dropped sufficiently to allow final processing.

The Otis Steel Co., Cleveland, J&L subsidiary now, is credited by WPB as being one of two steel companies to first produce plates for the shipbuilding emergency. This occurred voluntarily nearly a year ago. As early as January, 1941, Otis had commenced to shift from civilian to defense production of steel products. From about 10 per cent defense work in early 1941, production for this purpose increased rapidly in the ensuing months. By mid-year fully 50 per cent of the steel produced by the company was for defense purposes. This had reached 80 per cent before Pearl Harbor. From December 7 on, the figure has been 100 per cent.

Prior to the conversion of the continuous strip to plate, all of the company's plate production had come from a 152-in. mill at its Lakeside plant. Production of plate from this mill has practically doubled in recent months in spite of the fact that the equipment is far from new and that it has been difficult to provide adequate maintenance for it under an operating schedule which has cut "downtime" to the absolute minimum. This mill established an all-time record in April. Conversion of the Otis Steel Co.'s continuous mill from the production of strip to the production of plate for the war effort has been largely a story of adapting existing equipment to the needs of the moment. It has meant changing the chemical analysis of the steel used, altering size of ingots, revamping pit practice and rolling procedure.

Like every other strip mill in the country, at Otis the problems

have been concerned with getting the plate off the mill, finding sufficient table space for the steel to cool to working temperatures and shearing successfully the heavier steel involved.

One of the outstanding accomplishments in this field has been the conversion of a major part of the capacity of the world's fastest and widest strip mill to the production of steel plate vitally needed for shipbuilding. This is the Cleveland mill of Republic, built in 1937. Early in 1941, output was approximately 11,972 tons monthly. Month by month, records were broken, until today Republic's plate output is nearly 500 per cent greater than it was 18 months ago. Equipping the mill to turn out 5/16 in. and 1/2 in. plate in vastly increased quantities centered around two important steps.

First step was the installation of sufficient additional filler table and conveyor table facilities to

transfer the plate to the shears.

Second step was the installation of an effective hot leveling unit for the initial flattening of the plate immediately after it left the hot mill line. This unit has been installed at the end of the hot mill line just ahead of the hot mill transfer table and can be moved into position for leveling or out for coiling strip in five minutes.

The length of slab, however, is limited to 8 ft., about half the size which any one of the three slab-heating furnaces will accommodate, because of its final dimensions the plate must not exceed 53 ft. in length—the longest length which can be moved over the conveyor tables which deliver it to the plate finishing lines. Widths up to 90 in. are regularly being handled. In shipbuilding, particularly, wide plates help speed construction because they present fewer seams or laps to be riveted or welded.

Information Required on Purchase Orders for Steel

The Iron Age		TOOL STEEL			Stainless Steel	SAE Alloy Steels (excl. 9200 and 4000)	NE Alloy Steels (incl. 9200 and 4000)	Carbon Steels
		High Speed Steel (Including Tool Bits)	Alloy Tool Steel	Carbon Tool Steel				
Minimum Preference Rating Required	Mill ** Warehouse	A-1-k A-1-a †	A-1-k A-1-a †	A-10 A-1-a †	A-1-k A-1-a †	A-1-k A-1-a †	A-3 A-1-a †	A-10 A-1-a †
Certification of Pref. Rating (P.R. No. 3 or other authorized method)		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Group Class (M-21)		Yes *	Yes *	Yes *	Yes *	Yes *	Yes *	Yes *
Only one Group Class. Accepted on any order (M-21). See Note A.		Yes *	Yes *	Yes *	Yes *	Yes *	Yes *	Yes *
Purchaser's Symbol (P.R. No. 10)		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Allocation Class. Number (P.R. No. 10)		Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Delivery Date Required Day and Month (M-21-a)		Yes	Yes	No	Yes	Yes	Yes	No
Certify Delivery Requested is not Earlier than Necessary		Yes	Yes	No	Yes	Yes	Yes	No
Govt. Contract Number, if any (M-21-a)		Yes	Yes	No	Yes	Yes	Yes	No
Exact Name of Part (Gear, shaft, bolt, etc.) (M-21-a)		Yes	Yes	No	Yes	Yes	Yes	No

* This is not mandatory on orders to be shipped from warehouse or distributors' stock.

** These are minimum preference ratings required by the various general preference orders, but are no guarantees that materials so covered will be sufficiently rated to obtain required delivery.

† Warehouses can deliver 3 per cent of their quota of any stainless, tool steel or other alloy steel product on rated orders if certified for necessary maintenance and repair. They can ship 5 per cent for other carbon steel and iron products.

A—It is permissible for producers to accept more than one, but some producers will accept only the one.

AN ORDER FOR STEEL is a far different document today than it was a few months ago. Examination of this chart, prepared Aug. 1, shows the essential facts necessary under current conditions. The chart would be better if alloy tool steels were broken down into "high" and "low" alloy classifications, but as yet there are no official definitions available. Oh, yes! the order should still contain purchaser's name, amount of tonnage and similar details.

Is Slow Handling of Parts "Choking" Production?

Here's how the Stackbin System—made up of inexpensive, portable storage units—will speed up handling of parts and materials.

No stockroom tie-up! Parts can be located instantly without piling and unpiling boxes. Can be transferred from bin to tote pan and back again without a minute's loss.

No waste motions on assembly line! Parts can be placed within easy reach of workers. Units can be erected under benches, near machines.

The Stackbin System is speeding up handling of parts in aircraft plants—in most production-minded industries. Write for "Lower Cost Storage and Handling", Stackbin Corp., 89 Troy St., Providence, R. I.

IDEAL STOCKROOM UNIT

is this combination of Stackbins-in-Stack-racks. Parts and materials are transferred from one department to another, are used or processed and passed along in their storage container. No waste time—less loss, less damage.

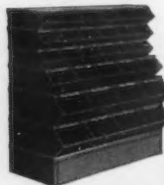


STACKBINS

are individual hopper-fronted storage bins—with perfectly smooth interiors—which nest to form work units and slide in Stackracks like drawers for storage.

STACKRACKS

are individual racks of heavy steel—made in any size you need. Locking together without tools, they make a strong, rigid storage rack of any capacity, height or shape you want.



FLEXIBLE, EASY TO ASSEMBLE

as sectional book-cases, nested Stackbin sections provide temporary storage space wherever needed. Many modern plants use them as room or departmental storage "depots."

SLOPING FLOORS

permit Stackbin Assembly Bins to feed parts continuously towards the front of the bin. Tapered front design provides semi-circular set-up, so that all parts are within easy reach.

All units in the Stackbin System are constructed of heavy steel—welded for permanent rigidity.

STACKBIN

STACKED
AND



STILL
ACCESSIBLE

SYSTEM

STACKBIN CORPORATION
89 Troy St., Providence, R. I.

New Association Formed By 24 Steel Warehouse Men

Cleveland

••• Representatives of 24 steel warehouses, which are ineligible for membership in the American Steel Warehouse Association, met in Cleveland July 27 to form a new national association. Most of the members will probably be warehouses whose major activity is handling of "seconds" and "rejects." Mr. Philip Brown, Reliance Steel Corp., Cleveland, is the temporary chairman; the executive committee consists of Herbert Appleby, Reliance Steel Corp., New York; James Dolan, Dolan Steel Products Co., New Haven, Conn.; S. M. Friedman, Nottingham Steel Co., Cleveland; John Hynes, Hynes Steel Products Co., Youngstown and Pittsburgh; Jules Soloman, United Steel Sales Co., Detroit; and William Weiss, Midland Steel & Equipment Co., Chicago.

Inland Ship Sets New Record

Chicago

••• The L. E. Block the Inland Steel fleet's flagship docked at Indiana Harbor last week with 16,348 tons of iron ore aboard. This was 96 tons over the L. E. Block's all-time carrying mark set on July 11.

Low Rated Foundries Still Get 15 Per Cent of Pig Iron

Cleveland

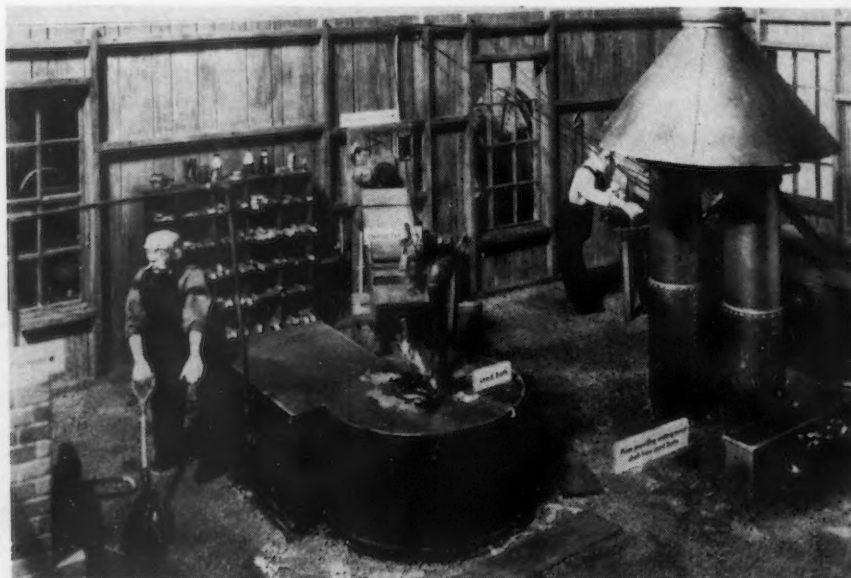
••• Although war plants are experiencing difficulty in securing steel on A-1-a ratings, and steel openhearth are idle due to lack of sufficient scrap, pig iron continues to be distributed to foundries with low ratings. It is estimated that 15 per cent of the August pig iron production will go to foundries with ratings lower than A-1-k. Thus, although steel priorities have gone back to the ingot, there is question as to whether they should go back even further to pig iron and scrap.

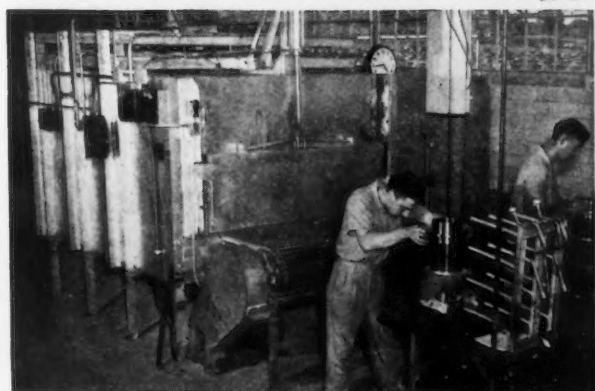
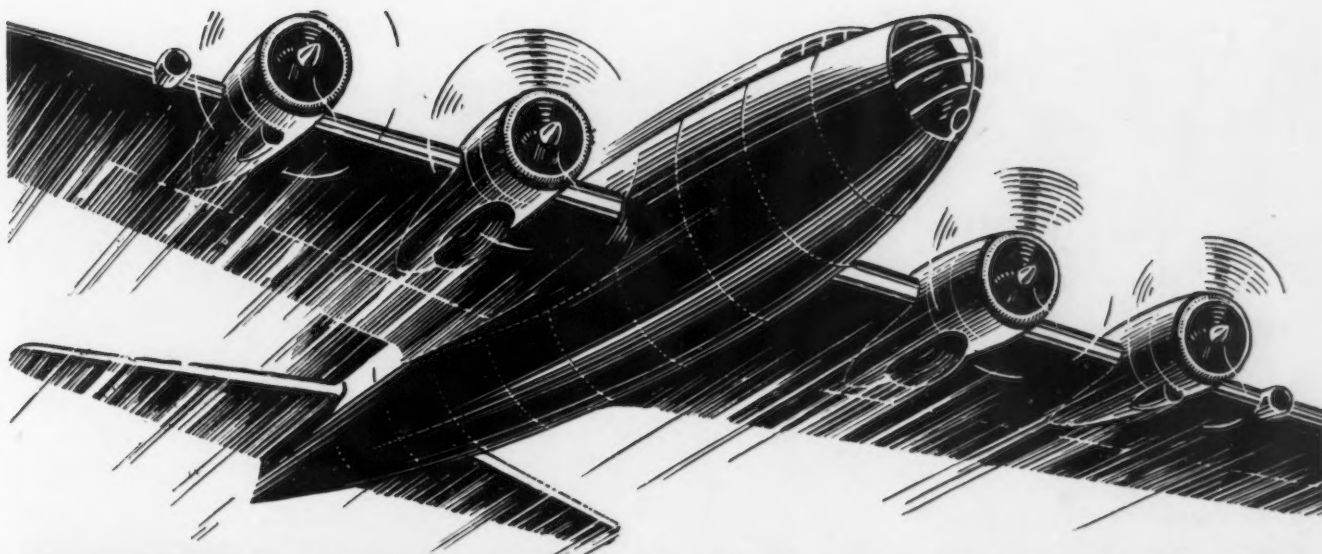
Canadian Machine Tool Builders Form Association

Toronto

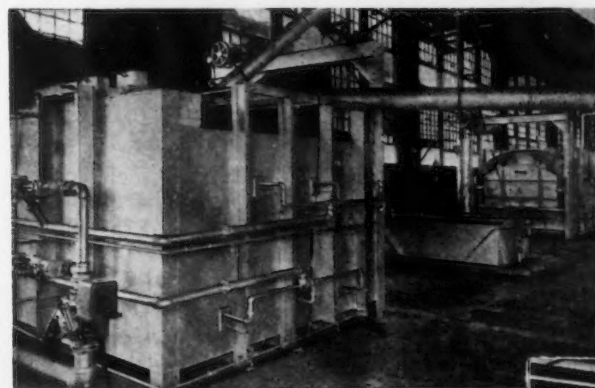
••• A Canadian Machine Tool Builders' Association has been formed here, it was announced by E. Barker, president of Modern Tool Works, Ltd., after a meeting called to discuss the shortage of skilled mechanics and toolmakers. Chairman of the new association will be H. C. Bertram of John Bertram & Sons, Ltd., Dundas, Ont. J. C. Scanlon, of Canada Machinery Corp., Galt, Ont., was named secretary.

19TH CENTURY TOOL STEEL: The origin of high speed turning and cutting is commemorated in this Smithsonian exhibit constructed by Bethlehem Steel. It shows the original Taylor-White laboratory in Bethlehem where they discovered an entirely new type of tool steel in 1898.





A leading aircraft manufacturer uses MAHR ovens for heating aluminum cylinder heads to the exact temperature required for assembly with motor parts.



Two MAHR Over and Under-Fired Heat Treating Furnaces with Oil Quench Tank and automatic temperature control.



FOR EVERY HEAT TREATING NEED

ANNEALING	Furnace Types:	Other MAHR
CARBURIZING	CAR BOTTOM	Equipment:
BAKING	PIT	RIVET FORGES
HARDENING	PUSHER	TORCHES
FORGING	ROLLER HEARTH	BURNERS
DRAWING	CONTINUOUS	BLOWERS
STRESS RELIEF	POT	VALVES
	ROTARY	SMITHING FORGES

THESE ARE THINGS EVEN THE PILOT DOESN'T KNOW!

Twisting. Banking. Rolling. Looping. Terrific power dives! The pilot's one thought is to complete his task and come through! The stresses and strains on the modern war plane are almost unbelievable!

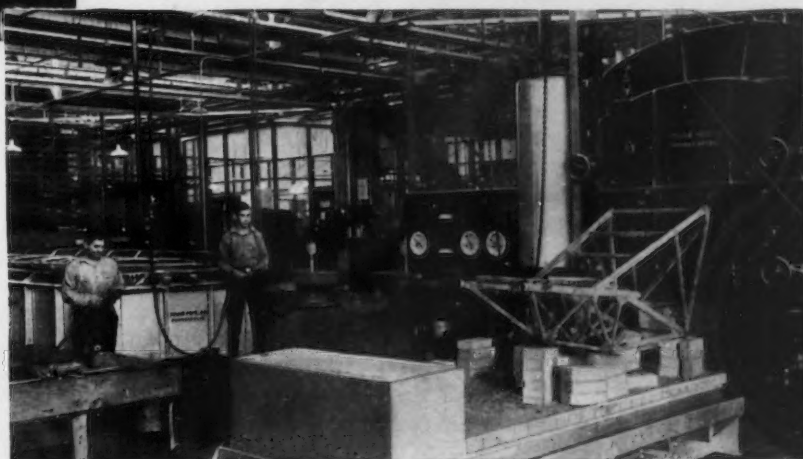
One vital reason the plane has the "guts" to take such punishment is the modern science of heat treating metals. The toughness, the lightness, the hardness, the exacting requirements for landing gears, struts, connecting rods, pistons, cylinder heads and hundreds of other parts—are largely the result of closely controlled heat treatment of extreme accuracy.

MAHR Furnaces are helping leading aircraft manufacturers give American pilots the toughest and best fighting planes. And for building guns, tanks, shells, battleships—MAHR furnaces are in daily use in plants all over America.

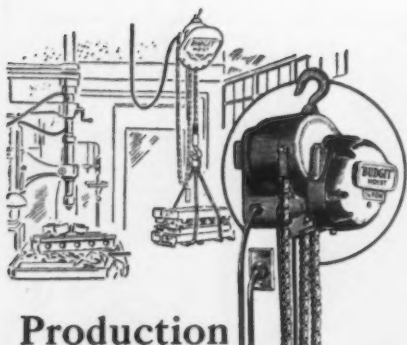
A MAHR ENGINEER CAN HELP YOU on ANY heat treating problem—for MAHR has a wealth of experience and has or can build exactly the size and type of equipment you need. Write, wire or phone today—there's a MAHR engineer-representative near you for quick consultation.

MAHR MANUFACTURING CO. DIV. DIAMOND IRON WORKS, INC.

GENERAL OFFICES—MINNEAPOLIS, MINN.
SALES OFFICES IN PRINCIPAL CITIES



A corner of heat treating department in a large aircraft plant, showing MAHR stress relief and salt bath furnaces.



Production is born of good tools

DIES, tools, jigs and fixtures are the most important factors in mass production—except for men's skill and muscles. 'Budgit' Hoists save the physical and mental energy of workers. They are as suitable in tool and die shops where lifting beyond a man's strength is needed, as on production assembly lines. Often they save an extra man. Always they speed up the work and ease the worker.

'Budgit' Hoists are portable, electric hoists with lifting capacities of 250, 500, 1000 and 2000 lbs. They are priced from \$119 up. Hang up, plug in, and use. For complete information, write for Bulletin 348.



Send for catalog containing complete information on Hoists, also, 'Time Saving Calculator' that shows savings they earn.



'BUDGIT'

Hoists

MANNING, MAXWELL & MOORE, INC.
MUSKEGON, MICHIGAN

Builders of 'Shaw-Box' Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties. Makers of Ashcroft Gauges, Hancock Valves, Consolidated Safety and Relief Valves and 'American' industrial instruments.



FIRE DAMAGE: On the night of July 21, fire completely destroyed the wire mill of Maurath, Inc., Cleveland, where stainless steel wire was annealed, pickled and drawn in the process of making arc welding electrodes. The plant will resume operations immediately, sub-contracting the wire drawing.

Report Tells of Canadian-U. S. Production Cooperation

Ottawa

••• The first report of the Joint War Production Committee of Canada and the United States, submitted by Milo Perkins of the United States Section and G. K. Sheils of the Canadian Section, reports efforts to reduce duplication, revise specifications, exchange supplies more rapidly, break transportation bottle-necks, eliminate tariff and other barriers, and exchange information on production methods and designs.

Canada's production of munitions for the second quarter of 1942, including many critical items, was reported increased nearly three times over that for the same period in 1941. Gear-meshing the war industries of the two countries, are ten joint technical subcommittees. Their work ranges from small arms, chemicals, guns, shells and communications, to tanks, airplanes and ships.

Short term gaps in supplies have been closed, by materials from the other country. Canada, said the report, shipped to the United States 500,000 shell bodies, fuses and tracers during a period when Canadian supply was running ahead of schedule. The shells were loaded, and now are being used by United States troops. On the other hand the United States

shipped 150,000 body castings for a certain type of shell, with the result that Canadian plants were able to load and ship finished rounds on schedule.

Steel plates and frames for Canadian Merchant shipbuilding were delivered from the United States, following action by the Maritime Commission. As a result several hundred thousand tons of merchant ships will slide down Canadian ways in 1942. Without the plates, output would not have been more than two-thirds of this. In another instance the United States Navy Department got quick delivery from Canada of 30,000 pounds of optical glass for sights.

Canadian Great Lakes grain boats will be switched this summer and fall to the movement of iron ore between United States ports, making possible the shipment of an extra 2,500,000 tons. United States orders for Canadian munitions have more than doubled in recent months.

U. S. Steel Gets ICC Permits

Washington

••• The ICC has granted a common-carrier certificate to the Isthmian Steamship Co., and contract-carrier permits to the Ohio Barge Lines, Inc., and the Warrior & Gulf Navigation Co., all U. S. Steel Corp. subsidiaries.



Official U.S.
Signal
Corps
Photo

ON THE *Warpath!*

Thousands of steam shovels, bulldozers and road building machines are blazing vital military trails to speed the flow of men, materials and munitions to our far-flung bases.

Plowing through miles of forests, muskeg, swamps, rockbeds and mountains—through fair weather and foul—in bitter cold and sweltering heat—these road builders must be brutes for punishment. So must their "first cousins" working on army camps, naval bases, air fields, power dams and other war projects. And DeVilbiss has helped to toughen their hides for these bruising jobs.

Leading producers of construction equipment are using DeVilbiss Spray-Painting Equipment to paint working parts and complete machines. It helps speed more and more of this essential equipment into war service—just as it's helping to rush ships, planes, tanks, guns, shells and fighting materials into action.

Right now, our job is to keep war material finishing in step with full-out war production—with speed to spare. We may have just the equipment you need to get coating and finishing operations moving at a faster pace. Your nearby DeVilbiss representative can tell you quickly.

THE DEVILBISS COMPANY • TOLEDO, OHIO
Canadian Plant: WINDSOR, ONTARIO

THE COMPLETE DEVILBISS LINE CONSISTS OF: Spray finishing equipment • Automatic coating machines • Tanks for spray materials • Spray booths and exhaust fans for vapor and dust elimination • Air regulators, cleaners and dusters • Air compressors • Respirators • Specialized hose for paint, air, water, gasoline, welding and pneumatic tools • Hose connections • Water and oil guns • Equipment to prevent offset in printing • Paint strippers • Medicinal atomizers.

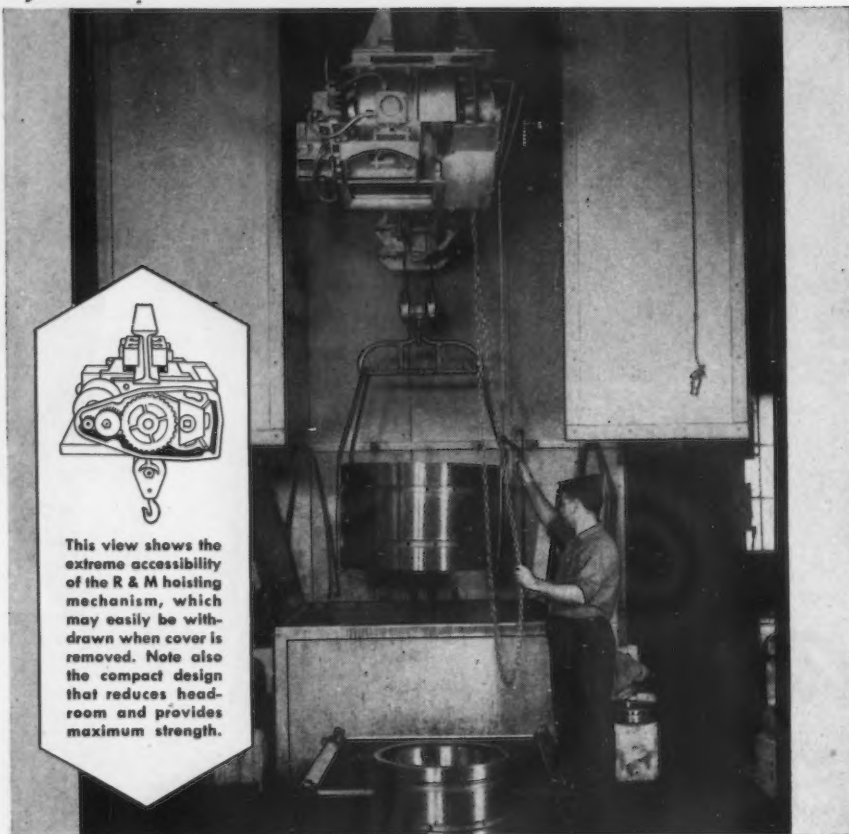


DEVILBISS

SPRAY SYSTEMS

9 R & M HOISTS

Speed this Firm's War Work!



This view shows the extreme accessibility of the R & M hoisting mechanism, which may easily be withdrawn when cover is removed. Note also the compact design that reduces headroom and provides maximum strength.

The Timken Roller Bearing Company—striving for *speed* as well as *precision*—keeps war production rolling at a record rate with 9 R & M Hoists.

This 5-ton model in the Timken plant—mounted on an R & M Motor-Driven Trolley—is dipping a 5300-lb. bearing in a slushing tank, while 8 others are making quick work of equally exacting lifting and conveying jobs.

R & M All-Steel Hoists—ranging in capacity from 1000 to 15,000 lbs.—are specified by production men for many reasons. They're all *steel* from track to hook; they handle loads from *any angle*, with perfect balance; they're *precision-built* to give years of efficient service—with minimum maintenance.

Whatever your hoisting problem, "take it up" with R & M! Our expert representatives will help you find the solution. Call the nearest R & M sales and service office, or write us at the factory.

R & M HOIST & CRANE SALES AND SERVICE OFFICES

Albany..... 364 Broadway	Cleveland... 352 Rockefeller Bldg.	New York..... 200 Varick St.
Atlanta..... 319 Walton Bldg.	Dallas..... 1100 Cadiz St.	Philadelphia... 401 N. Broad St.
Baltimore, Lombard & Concord St.	Denver..... 1420 16th St.	Pittsburgh..... H. W. Oliver Bldg.
Boston..... 55 Long Wharf	Detroit..... 2921 E. Grand Blvd.	San Francisco, 116 New Mtgmy. St.
Buffalo..... 2005 Delaware Ave.	Houston... 3715 Harrisburg Blvd.	Seattle..... 216 Walker Bldg.
Chicago..... 2400 W. Madison St.	Jacksonville... 305 Biebee Bldg.	Syracuse..... 204 State Tower Bldg.
Cincinnati..... 418 New St.	Newark..... 700 Bergen St.	
	Montreal.... Lyman Tube & Supply Co., Ltd.	

ROBBINS & MYERS • Inc.

HOIST & CRANE DIVISION • SPRINGFIELD, OHIO

MOTORS • FANS • MOYNO PUMPS • FOUNDED 1878

Bethlehem Rate at 97; Lack of Scrap a Factor

New York

... Insufficient scrap is the principal reason causing the plants of the Bethlehem Steel Co. to operate currently at 97 per cent of capacity, Eugene G. Grace told a press conference here last week. This rate, which contrasts sharply with a figure of 102.6 per cent in the second quarter of 1941, is also due to furnaces down for repairs and to the curtailment of foreign ore shipments, he said.

Mr. Grace added that the industry's scrap drive is beginning to show some results, but that the company is making no headway in accumulating scrap. He pointed out that stockpiles at Sparrows Point and Lackawanna are being drawn down at a time when they should be piling up against the coming winter.

Rolling Records Set in 1901 Inland Steel Mill

... Three veteran employees and the oldest mill at Inland Steel's Indiana Harbor plant have combined to set two marks in this company's war production record book. One record was rolling 1425 tons of angle shapes and of plates in the 24 in. structural bar and universal plate mill in 24 hr. The other was the hourly record for shapes which was bettered by five net tons an hour. The three rollers who established the records are Dan Fabian, employed by Inland since 1912, Joe Carner, since 1910, and Elmer Pearson, since 1924. The mill was built in 1901.

Dutch Are Largest Foreign Holders of U. S. Steel Stock

... Dutch nationals hold more common stock of the U. S. Steel Corp., than all other foreign groups together, according to a company announcement. On June 30, 1942, Dutch holdings of common amounted to 305,919 shares, out of total foreign holdings of 491,504 common shares. Canada is second in this group with 105,652 shares, and England is third with 36,563. Preferred shares in the hands of foreigners totaled 55,158 on that date. Of these the Dutch held 19,626, the Canadians 16,573, and the English 3,111.



WHITE HOUSE CALLER: Myron C. Taylor, President Roosevelt's emissary to the Vatican, walks through the rain from his hotel to keep a White House appointment with the President.

Electroplating Repairs 35-Ton Shaft in 24 hr.

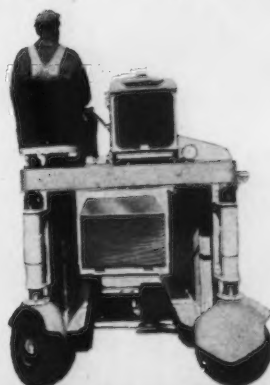
• • • Five thousandths of an inch of copper plating recently averted a threatened shortage of electric power in the Boston area, when a vertical steam turbine in a power plant developed a bad chatter and had to be shut down.

Investigation showed the shaftway running through the center of the turbine's rotating field had so worn that the rotating field did not fit snugly enough on the 35-ton shaft. The suggestion was made that the chatter might be eliminated by building up the shaftway with an electro-deposition of copper, the largest plating undertaking ever attempted. A deposit varying from 0.002 to 0.005 in. did the job and the turbine was ready for service in about 24 hr. Representatives of the Tremont Old Colony Plating Company of Boston plated the shaftway with the assistance of Du Pont's Electroplating Division.



ROSS CARRIERS SPEED HANDLING!

Simple as A B C—straddles a load of any length—picks it up—and delivers it where you want it—minutes faster per load than by ordinary methods or by "fixed travel" means of materials handling...**FLEXIBILITY** and speed are the features that make Ross 70-H Carriers indispensable in industrial plants, yards and docks. Bulletin I-82 fully describes these time and money-saving Ross Industrial Carriers. A copy will be sent you upon request.



REAR VIEW OF "70-H"

Clear vision for the operator—large load capacity, unlimited load length — unrestricted travel "out of bounds" or wherever your materials are needed . . . Extremely sharp turning radius lets Ross Carriers work in cramped quarters.

ROSS CARRIER COMPANY

HOBOKEN, N. J. NEW YORK CITY SEATTLE VANCOUVER, B. C.
SAN FRANCISCO PORTLAND Factory: BENTON HARBOR, MICH.

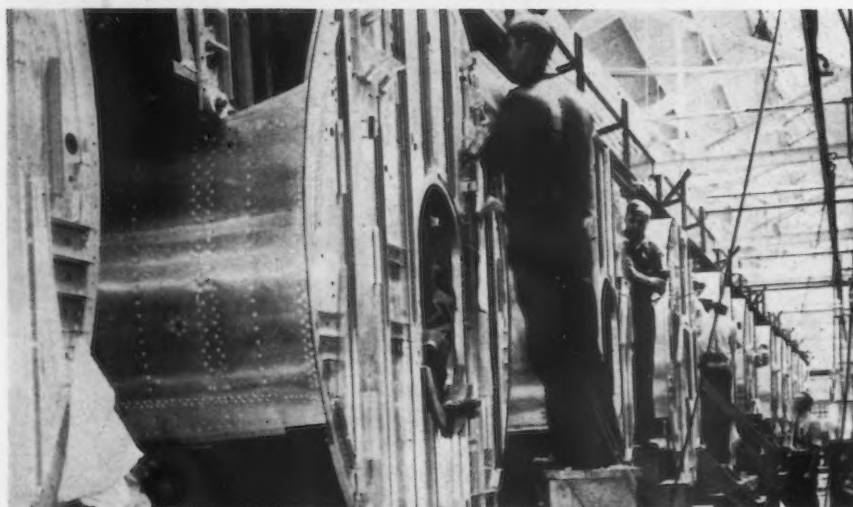


Chrysler Bombers Coming Off Line In Record Time

TOP

COMING UP: Bad news for the axis in these bombardier and control sections in the Chrysler bombers which are coming along in fast time.

o o o



LEFT

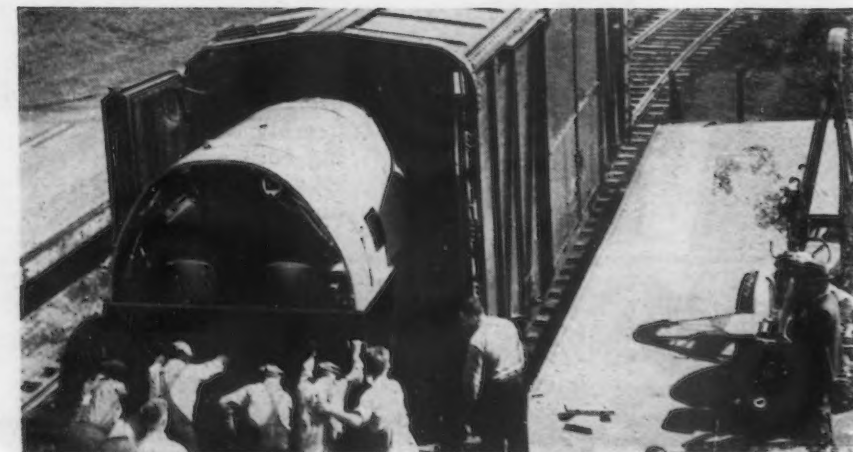
FAST WORK: Five months after drawings were made these bombers are on their way to beat the axis.

o o o



WOMEN AT WORK: Bomb bay section of bombers being riveted by women workers who are doing their part in helping to defeat the axis.

o o o



READY FOR FINAL ASSEMBLY: Nose and center fuselage sections completed for shipment to the final assembly plant.

Filling Ranks in Huge Allied Bomber Fleet

DESTINED TO SOAR:

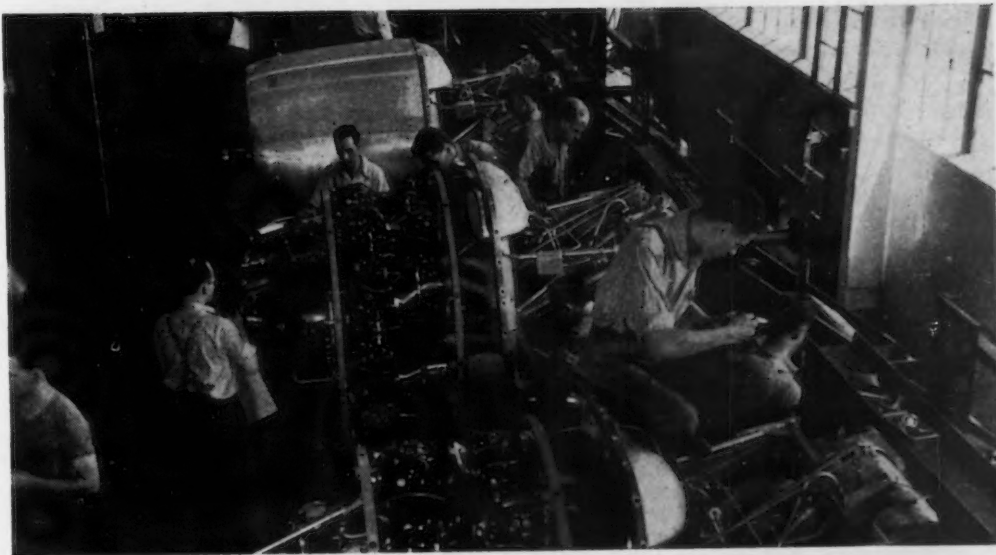
Wings built to take all the pounding a super-power motor can give, and to deliver destruction to the Axis, are shown on the assembly line at a U. S. plant. Note tubing fitted into the wings.



o o o

POWER HOUSES:

These motors are being prepared for installation into a medium bombing plane, one of hundreds turned out monthly in the big push to maintain bombing supremacy and turn the war tide.



o o o

MILES OF WIRES:

Literally miles of wires are required to link the nerve centers of the complex new bombing planes which the United Nations are producing. This photo gives an idea of what's under the skin.



Told in Brief

••• **Chicago**—Track and bridges from two unprofitable branch lines of the Illinois Central and Chicago & North Western railways, totaling nearly 9000 tons, have been ordered scrapped and have been requisitioned through the Metal Reserve Corp.

••• **New York**—The New York Central System, with three large shops already devoted to war production, announces the receipt of a new initial order for a special type of marine equipment to be produced in its shops.

••• **Schenectady** — G-E's "Legion of Quality," a spoilage-reducing organization in the West Lynn works, using a slogan "42 per cent less spoilage in 1942," has made a record 3.7 per cent ahead of their goal for the first six months.

••• **Buffalo** — The Friend Mfg. Co., Gasport, N. Y., maker of pumps for agricultural sprayers, has purchased an interest in the Lobee Pump & Machinery Co., Inc., of Buffalo. The Buffalo concern will continue to operate.

••• **New York**—The Fairfield yard of the Bethlehem Shipbuilding Corp. has delivered twenty-one 10,000 ton Liberty ships during June and July.

••• **Buffalo** — Bell Aircraft Corp., maker of the famous Airacobra, celebrated its seventh birthday on July 10. It is now Buffalo's largest industry.

••• **Pittsburgh** — Follansbee Steel Corp., has appointed Lapham-Hickey Co., Chicago, as its sales representative in that area. E. J. Bausch, former Pittsburgh representative, will join the Lapham-Hickey staff.

••• **Pittsburgh** — Alterations, permitting participation in the Naval Ordnance program, will soon be started on the National Brass & Copper Co., Inc., plant at Lisbon, Ohio, at a cost of \$500,000 by Rust Engineering Co., Pittsburgh.

••• **Schenectady** — Orders for several million dollars worth of electrical equipment have been placed with the International General Electric Co., for the new \$50,000,000 Brazilian rail and plate mill.

••• **Chicago**—The Chicago Association of Commerce announces that new plant construction and expansion programs in the Chicago area in June totaled \$92,054,000 compared with \$24,496,000

in the same month a year ago. The month's most outstanding project was a 900-acre synthetic rubber plant.

••• **Dallas** — Southwest Region WPB has issued a national appeal to furnish a huge number of second-hand oil tanks, and pipe, four-in. and larger, to conserve new material. Communications should be addressed to William G. Morrison, 817 Fidelity Building, Dallas.

••• **San Francisco**—The Joshua Hendy Iron Works, Sunnyvale and Long Beach, Cal., was awarded the coveted Maritime "M," July 23, according to Charles E. Moore, president. This is the first "M" award in California and one of eight throughout the country.

••• **Pittsburgh** — Westinghouse Electric & Mfg. Co., has announced the cancellation, as a steel conservation measure, of a projected \$14,000,000 war plant scheduled for Greensburg, Pa., where navy propulsion equipment would have been made. The equipment will be built elsewhere.

••• **Pittsburgh** — Ingram-Richardson Mfg. Co. of Beaver Falls, has developed a new non-metallic processed sign which uses no critical materials and can be supplied without allocation or priority orders.

••• **Toronto**—Officials of Fairchild Aircraft Ltd. announce that their company has been licensed to build a large number of the new Curtiss-Wright "Helldiver" dive-bombers for the United States Navy at its plant at Longueuil, Que. Canadian Car & Foundry Co., Ltd., Fort William, Ont., also has a contract totalling about \$60,000,000 for building this type plane.

••• **Cleveland**—Hamilton Foundry & Machine Co. recently held impressive ceremonies, dedicating a new flag pole and a new flag to the Hamilton foundry men in service, and hoisting the Treasury flag for achieving the 10 per cent of payroll goal. The pole is topped by an eagle of cast iron, replica of one produced by one of the founders of the company.

••• **Pittsburgh** — Admiral Watts, retired, made a complete inspection recently of the Jessop Steel Co. plant in Washington, Pa., and highly praised officials for the mill's efficiency.

Pig Iron and Steel Output For Canada Drops Slightly

Toronto

••• **Steel ingot** and pig iron production in Canada for June fell slightly below the total for May. With the completion of repairs and the blowing in of another blast furnace by Algoma Steel Corp. Ltd., at Sault Ste. Marie, however, pig iron production rose 6 per cent at the end of the month bringing production for all Canada to 100 per cent. Canada has a total of 12 blast furnaces, with rated annual capacity of 2,123,320 net tons.

Operation of steel furnaces was reduced to 95 per cent from 99 per cent in the preceding two months, operations holding at a daily average of 8472 tons against 8782 tons in May. No additions were completed to steel making facilities.

Pig iron production totaled 167,961 tons, compared with 171,386 tons in May and 125,790 tons in June, 1941. At the end of June stocks of pig iron held by producers amounted to 48,042 net tons compared with 37,720 tons at the end of May.

For the six months ended June 30, pig iron production totaled 974,000 tons, compared with 700,617 the first half of 1941.

Output of ferro-alloys in June amounted to 14,664 net tons.

Steel ingot and castings production totaled 254,163 tons, against 272,247 tons in May and 209,622 tons in June, 1941, the decline being partly due to minor shutdowns for repairs. Steel production for the first half of this year totaled the all time record of 1,559,238.

Film Shows Plant Safety

••• **The importance of safety** to the war effort is shown in "We're on the Spot," a motion picture recently produced with the cooperation of the National Committee of the Conservation of Man-Power in War Industries, a Department of Labor unit. The picture, intended for plants, training classes and vocational schools pictures common accident hazards and employer and worker responsibility. King Cole's Sound Service, Inc., 203 East 26 Street, New York, is distributor.

Effort Under Way to Ease Vinson Contingent Fee Bill

Washington

••• So drastically drawn that it would virtually prohibit payment of commissions of any kind in connection with a government contract, an effort will be made at hearings before the Senate Committee on Naval Affairs to have the Vinson contingent fee bill modified so as to permit continuance of legitimate activities in procuring government contracts. Hearings will begin in about two weeks.

The measure was passed by the House on July 20 and has created deep concern because it would break down the long established system of government buying and create confusion, it is claimed, in the midst of the war program. Services of thousands of representatives of manufacturers and other suppliers would be denied to the government. Machine tool makers and dealers have shown particular concern over the bill and it is said will make presentations before the Senate Committee to have it redrafted. Especially hard hit would be small manufacturers who are dependent on commission dealers to transact business with the government.

The real purpose of the bill cannot possibly be challenged. On the contrary, the purpose has widespread approval, not only in the legislative halls but in industry as well. The bill is designed to clamp down by means of fine and imprisonment on high powered "agents," "sales engineers" and other lobbyists who have netted big fees on government contracts. But as drafted it goes far beyond that desirable point. It is so broad that it has been interpreted to mean it would bar compensation on a contingent fee basis for legitimate services in connection with government contracts wherein the method of calculating the value of procured contracts has any relation whatever to the amount of the contracts.

The bill, under a penalty of a fine of not more than \$5,000 or imprisonment for not more than five years, or both prohibits:

1. Any compensation the payment of which is conditional upon procurement

by any person of a government contract or any specified number or amount of such contracts, or,

2. Any compensation the nature or amount of which is determined with reference to the number or amount of government contracts procured by any person.

When the latter provision is read in connection with Section 2 of the bill, it has been held that it might be construed to make unlawful the payment of fees to a lawyer "for services rendered in connection with the negotiation for" any government contract. If the compensation is determined "with reference to the number or amount of government contracts procured by any persons," even though the services are in no way related to the "procurement" of the contract, the measure as now

phrased might apply since it does not limit the "procurement" to such person.

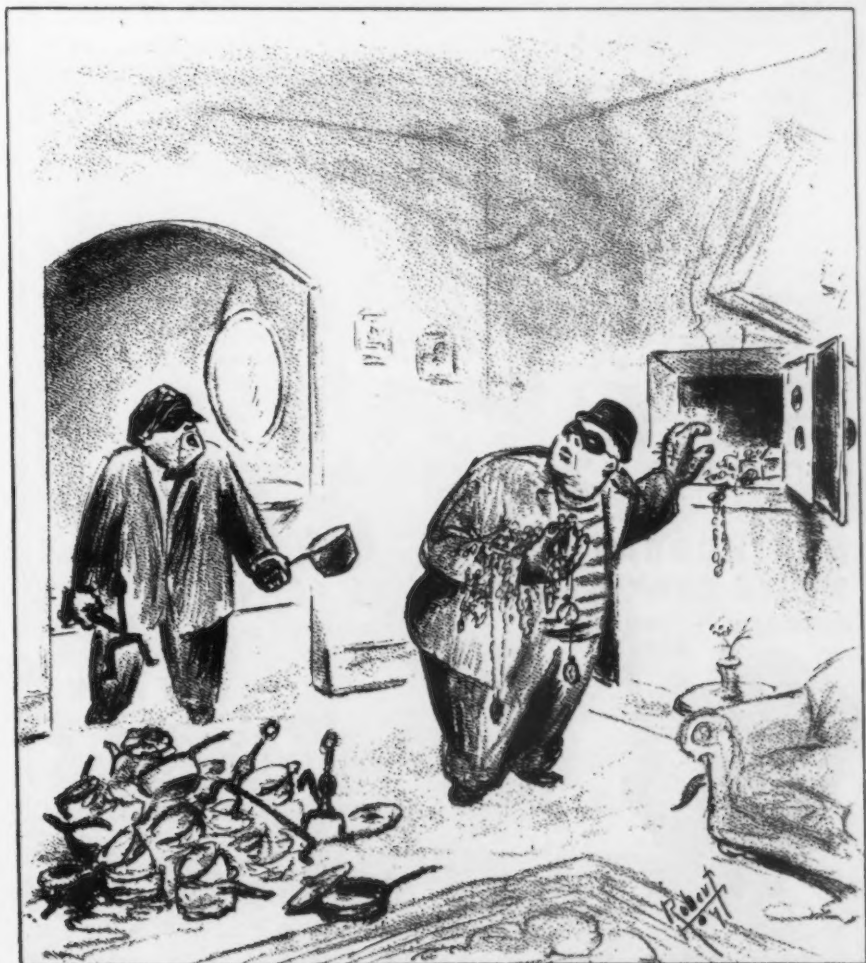
Upsetting the existing manufacturer-dealer relationship, the bill would outlaw the salaried representative employed by a company on a commission basis. He would be unable to sell to any government agency and receive a commission on such sales. This type of employment arrangement is common among many companies, especially the smaller ones.

Handy & Harman Honored

••• The new joint Army-Navy production award for high achievement in the production of war equipment has been awarded to Handy & Harman, New York. Formal presentation is to be made Aug. 15 in Bridgeport, where the company's principal plant is located.

FROM A TO ZINC

BY ROBERT HOYT



"Listen, Pal—when you gonna loin to leave off dat junk and concentrate where da real dough is?"

Priority Setup Is Clarified in Letter

Washington

• • • In an effort to end confusion resulting from recent WPB actions affecting production and distribution, Amory Houghton, WPB director general for operations, and Reese H. Taylor, chief of the WPB iron and steel branch, last Thursday sent a letter to all iron and steel producers outlining the vari-

ous priority devices and the relationship between them. This clarifying letter was prepared after consultation with prominent steel executives, including President Benjamin F. Fairless, United States Steel Corp.; President Eugene G. Grace, Bethlehem Steel Co., and President Charles R. Hook, American Rolling Mill Co.

The letter follows:

"1. *Preference Ratings.* At present these consist of AAA, AA-1 through AA-4, A-1-a through A-1-k, A-2 through A-10.

Urgent Request for Heat Treating Data

• • • To expedite vital war production, the WPB is seeking all available heat treating facilities which can be used to break the bottleneck existing in this field. Idle furnace capacity should be reported to the Heat Treating Equipment Unit, War Production Board, Room 4520, Social Security Building, Washington.



Quick Economical Solutions to Many Design and Production Problems

SPRINGS

STAMPINGS

WIRE FORMS

What type of Spring, Small Stamping, or Wire Form is most suitable? What is the best kind of material to make it out of? How can it be applied to your product to best advantage?

Whatever your problem may be, call on Hubbard for information and recommendations on the many types and uses of Parts Like These.

**M·D·HUBBARD
SPRING COMPANY**
331 Central Ave. • Pontiac, Mich.

Higher rated orders take precedence over lower rated or unrated orders except as hereinafter indicated.

"2. *Production Directives.* These are instructions requiring a producer to produce a given minimum quantity of a specified product within a stated period. They have heretofore been issued by letter signed by the director of industry operations. In future, they will be issued on forms PDL-87 and 88 signed by the director general for operations. These production directives must be strictly followed regardless of the impact of preference rated orders. In case it becomes necessary at any time to change a production directive, this will be done only by definite instructions of the director general for operations referring specifically to the production directive to be changed.

"As the name indicates, these directives affect production only. Distribution of the products when produced is to be made in accordance with preference ratings or other applicable rule.

"3. *Total Allocation.* Production and delivery of certain products, such as steel plates and alloy steel, are subject to full control through approval of production or delivery schedules. A producer in preparing his schedule should be guided by applicable preference ratings and should schedule higher rated orders in preference to lower rated orders. The schedules are then submitted to the WPB where they are reviewed by the appropriate branches, and by representatives of the Army and Navy. After necessary modifications have been made, the producer is advised on form PD-202 as to the approved schedule. Production and delivery in accordance with such approved schedule is thereupon mandatory, regardless of preference ratings, even though this may result in giving a lower rated order precedence over a higher rated order.

"4. *Allocation Orders.* Numerous allocation orders have been issued on forms PD-201 and 220. Use of these forms will be largely discontinued in future. The iron and steel branch is now reviewing outstanding allocation orders of this type and issuing ratings instead. Material covered by such orders will, upon re-rating, take its place in production and delivery schedules in the proper position depending upon the rating assigned. Until rerated, outstanding allocation orders will continue to take precedence over all rated orders.

"As stated, allocation orders of this type will be used infrequently in future. It may be necessary to use them in cases of exceptional urgency. It is also contemplated that they will be used in order to provide semi-finished material to non-integrated mills operating under production directives of the type described in paragraph 2. When allocation orders are issued they will continue to take precedence over preference rated orders and everything else except production directives.

"5. *Latin American Exports.* Under order M-148, orders for export to Latin America, when covered by export license, are given the status of allocation orders. All such orders for delivery in the third quarter of 1942 will remain in this status until further notice and are to be given precedence over preference rated orders. We are advised that the system will probably be changed for the fourth quarter and that these exports will in such cases be given preference ratings. In that event they will, of course, be produced and delivered as their ratings justify."

B. & O. Shops Producing Parts for Liberty Ship Engines

Baltimore

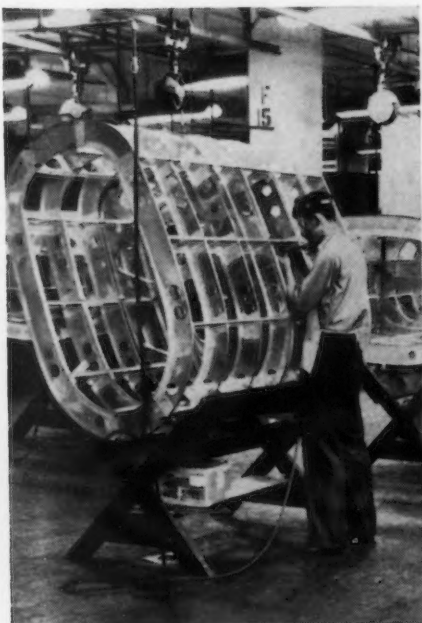
• • • The Baltimore & Ohio Railroad's shops in the Baltimore area have started producing parts for the engines of the Liberty Ships that are being built at the Bethlehem-Fairfield Shipyard. The B. & O. shops are working on a sub-contract to machine "crosshead guides" and "guide plates" from rough iron castings. These parts are used in the vertical triple-expansion marine engines which propel the Liberty Ships.

Steel Employment Hits Peak of 659,000 in June

• • • Employment in the steel industry reached a new peak in June when 659,000 employees were at work, according to the American Iron & Steel Institute.

The June figure was 3000 more than the total of 656,000 employees at work in May, and was substantially higher than in June, 1941, when 638,000 employees were on the payrolls of the industry. Total steel payrolls during June amounted to \$118,067,000, compared with \$117,403,000 in May and with \$110,504,000 in June a year ago.

BOMBER FUEL TANKS: Auxiliary fuel tanks, to increase the flight range of bombers, under construction at a plant of the Fisher Body Division of General Motors.



Rust Furnace Gets Award

Pittsburgh

• • • Contract for design and supervision of construction of a continuous slab reheating furnace for South African Iron & Steel Industrial Corp., Ltd., has been awarded to Rust Furnace Co. Some material will also be furnished by Rust Co., according to its announcement.

Ore Boat Makes Record

Chicago

• • • Doing her part to help the Great Lakes fleet meet war shipping demands, the L. E. Block of the Inland Steel Co. fleet has set another record—the second during July. Inland's flagship docked at Indiana Harbor last with 16,348 tons of iron ore aboard. This was 95 tons over the L. E. Block's all-time carrying mark set on July 11.



BUY QUALITY MATERIALS

The use of quality materials is a good guarantee against unnecessary interruptions of top-speed production. That is why Garlock packings, gaskets and oil seals are in use in so many factories today.

From past experience industry knows it can rely on Garlock quality for the long, dependable service so vital in today's war effort.

THE GARLOCK PACKING COMPANY, PALMYRA, N.Y.

In Canada: The Garlock Packing Company of Canada Limited, Montreal, Que.



GARLOCK

Machine Tool Urgency Standings Outrank New Super-Ratings

Washington

• • • Issuance of super-ratings from AAA down to AA-4 under Priorities Regulation No. 12 has not altered the principles set forth

in Interpretation No. 2 to Order E-1-b, WPB states. This interpretation points out that where tools are required by service contractors listed on the numerical mas-

ter preference list the order of urgency is determined by the standings on the list, and that an AA emergency rating will not obtain quicker deliveries. This rating only serves to give a priority to a contractor not on the list over another who is not listed either.

Interpretation No. 3 to Order E-1-b was issued last week to make it clear that the application of super-ratings to machine tools for a service purchaser who has an urgency standing does not change in any way the date of delivery of the tools. The urgency standing and the required delivery date still determine the ultimate delivery date. Since the service quota amounts to 75 per cent, this means that 25 per cent of machine tool production may be affected by the application of AAA and AA ratings.

In this connection it is understood that Interpretation No. 1 to Priorities Regulation No. 1, issued July 21, will not be valid where urgency standings are involved. This interpretation gives preference to equally rated orders on the basis of the dates they were entered. While no official statement has been issued, it is expected that a clarification will shortly be issued so as not to destroy the fabric of the carefully set up urgency standings system.

Foundry Is "Metal Mill"

Washington

• • • Industry will be surprised to learn and unable to understand, but WPB has defined a foundry as a "metal mill." This was done last Thursday to exempt foundries from the requirement of filing form PD-25A to secure metals for casting, leaving only maintenance and repair items in excess of \$5,000 to be secured through the PRP form. In the lexicon of the trade, a foundry is an establishment that melts and casts metal, whereas as related to metals a mill rolls material.

H. O. King, chief of the WPB Copper Branch in supplemental instructions for filing under the PRP plan reasoned, "A foundry is a 'metal mill' since it melts pure ingot, alloy ingot, pig and scrap to produce rough castings. Since 'castings' is one of the forms listed


MEMORANDUM

To Production Executives:


If material or specification changes are necessary—requiring changes in tools, feeds or speeds—check the cutting fluid factor with

Stuart Oil
Engineering Service


Selecting the right cutting oil to fit conditions, which sometimes change over night, will eliminate one possible source of time-wasting, production-slowness trouble. We are equipped and ready to help you



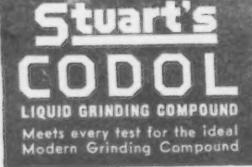
Stuart's
Thred-Kut
HEAVY DUTY CUTTING OIL
Recommended by America's leading machine tool builders



Stuart's
SOLVOL
LIQUID CUTTING COMPOUND
For carbide tools and where an "aquamix" solution is recommended




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"SUPER-KOOL"
AMERICA'S FIRST TRANSPARENT SULPHURIZED CUTTING AND DRAWING OIL



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LIQUID GRINDING COMPOUND
Meets every test for the ideal Modern Grinding Compound

For All Cutting Fluid Problems
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Engineering
Goes with every Barrel

PRIORITIES

on the Metals List attached to Priorities Regulation No. 11, a foundry should not report ingot, pig or scrap on PD-25A, because it processes these materials to produce metal in the form set forth on the Materials List."

If a manufacturer has a finishing operation in connection with a foundry, he should report his equivalent requirements in weight of rough castings. Thus, a valve manufacturer who operates a foundry would not report brass ingots on PD-25A, but would report the equivalent weight of rough brass castings which he finishes and assembles into valves.

Kitchenware Order Extended

Washington

••• Existing restrictions on the use of iron, steel and zinc in the production of kitchen and household articles were extended last Friday to Aug. 15 by WPB in an amendment to order L-30.

Hand Elevators Exempted

Washington

••• Hand elevators were exempted from the production and delivery restrictions of Order L-89 by an amendment issued by WPB last Friday. The amendment also made it clear that electro-hydraulic elevators are included under the category of hydraulic elevators originally excepted from limitations of the order.

Chlorate Chemicals

••• A provision that will permit stockpiling of chlorate chemicals by large industrial users was added to the chlorate chemicals order, M-171, Aug. 1.

Petroleum Industry Survey

Washington

••• A survey of the anticipated requirements of critical materials that will be used by the petroleum industry during the last quarter of 1942 was begun last Thursday by the Office of Petroleum Coordinator for War. OPCW also wants to discover the quantity of critical materials used by the oil industry during the April-June quarter, the inventory position on June 30.

WPB's Materials List No. 1 will be used as a guide in determining critical material use. The information will be submitted to the WPB Requirements Committee by Aug. 15.

Military Exemption List

••• The Director General for Operations July 30 added a number of items to the "Military Ex-

emption List" of Copper Conservation Order M-9-c. Copper may be used without limit for the manufacture of these articles when ordered by the military services of the United States and for certain other agencies. The list includes:

Bells for use on board ship; containers for radio and communication equipment; chronometer and watch cases; dishwashing machines; floats for liquid level control; furniture hardware for use within magnetic circle on board ships; insect screening; lights, lamps and accessories; locks and latches; paint for ship bottoms;

STRONG CAST



BETTER STEEL CASTINGS DEMAND BETTER STEEL MAKING

The high regard Strong Steel castings have won in so many industries reflects Strong's skill as steel makers as well as steel casters. The melt being poured above comes from a 25 ton, acid bottom, oil fired, open hearth furnace of special Strong design. It will pay you to know Strong steels well—write or wire for the facts.

STRONG STEEL FOUNDRY COMPANY, BUFFALO, N. Y.

STRONG

TENSILE STRENGTH • ELONGATION

PRIORITIES

photographic equipment and supplies; prescription scales; reflectors for lights; safety lamps; shells and caps for electric sockets; telescopes; unions and union fittings.

The following items are added to the list until Sept. 1, pending further discussion as to their permanent status:

Air conditioning equipment; bakery equipment; functional parts of carbonated beverage dispensing units; clock cases; conduits for radio and communication equipment; electrical coffee grinders, urns, ranges and deep fat fryers; conductor parts of electric fans; fittings for handling liquid gases; flashlights; food mixers; kitchen utensils, laundry equipment; miscellaneous ship fittings; identification plates; certain plumbing and heating supplies; hinge pins; printing rollers, refrigerator parts; soda fountain equip-

ment; unit heaters and heater parts; valve handles.

Copper Ratings Raised

• • • Communications companies were granted higher ratings in amendments to Orders P-129 and P-130 so as to enable them to obtain copper. Both amendments raise the ratings from A-3 to A-1-j. The former applies to maintenance, repair and operating supplies for radio, telephone, tele-

graph and cable companies; the latter covers operating construction for telephone companies.

Furnace Replacement Parts

• • • Replacement parts for furnaces may be manufactured over and above quotas established by L-22, WPB pointed out last week in an interpretation of the order. The order provides that during the calendar year 1942, no manufacturer may incorporate into furnaces iron or steel in excess of certain specified quotas. However, no restrictions are placed on the manufacture of replacement parts for furnaces.

Rebuilt Laundry Machinery

• • • To plug the loophole left for dealers to sell reconditioned or rebuilt laundry and dry cleaning machinery on an "as is" basis with an understanding to rebuild it later, WPB has issued an interpretation to Order L-91. It states that the restrictions of the order apply to machinery which cannot be used effectively by the

WELDER TRAINING BOOTHS: The Twin City plant of Ford Motor Co. has set up a score of welding booths and has already trained 200 men on this Lincoln Electric welding equipment.




FORGINGS

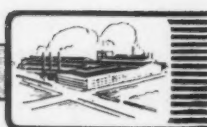
CASTINGS

From raw materials to finish machined product your orders for finest quality Forgings receive our individual attention . . . Erie is all out for Victory.

Today, speed, accuracy, and quality in Steel Castings count vitally for Victory.



ERIE FORGE COMPANY, ERIE, PA.



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PRIORITIES



U-BOAT'S NEMESIS: Worker in a Pacific Coast plant assembling screw tops for depth charges. Some of these very parts may be responsible for blowing a lurking raider to perdition.

purchaser unless rebuilt or reconditioned.

Electric Meters Curtailed

• • • Production of the common household electric meter will be curtailed for the duration under an order issued by WPB. At the same time, restrictions on deliveries to take effect immediately were ordered. General Limitation Order L-151 provides that manufacture of all so-called "domestic watthour meters" are to be prohibited after Sept. 26. Production of meters in the interim is restricted to 2½ per cent of the total number of meters manufactured by any producer during the entire calendar year 1941.

Iron and Steel Plates

• • • Deliveries of iron and steel plates have been restricted to ratings of A-1-k or higher by an amendment to Order M-21-c. The order previously prohibited producers from making deliveries at

lower ratings and this action prohibits others from doing so. Exceptions are made for deliveries by warehouses for maintenance and repair; for "special sales" to designated classes of buyers as authorized by P.R. No. 13; and with special WPB authorization.

Canadian PRP Order Issued

• • • C. D. Howe, Minister of Munitions and Supply, issued an

order on Aug. 1 setting up the Production Requirements Plan in Canada. It established quotas for all manufacturers using more than \$5000 worth of metals in any quarter. Manufacturers were required to report inventory, end use and requirements for the third quarter on forms due July 31. The zero hour for filing fourth quarter forms has been advanced



INSTALL A WELLS METAL CUTTING BAND SAW

Today's all-out war program, calls for close efficiency in cost and consumed time in production. A WELLS METAL CUTTING BAND SAW has solved the problem in thousands of plants. A rugged, accurate Wells saw, with its many features and flexibility, is a real asset to your plant.

Write for further details.

SPECIFICATIONS

WELLS No. 8	
Capacity: Rectangle	8" x 16"
(spec. bowed guides)	5" x 24"
Rounds	8" dia.
Speeds: ft. per min.	60, 90, 130
Motor	Specifications optional
WELLS No. 5	
Capacity: Rectangle	5" x 10"
(spec. bowed guides)	5" dia.
Rounds	5" dia.
Speeds: ft. per min.	60, 90, 130
Motor	Specifications optional



WELLS MANUFACTURING CORPORATION • Three Rivers, Michigan
A large stock of blades is available at all times

WELLS METAL CUTTING BAND SAWS

PRIORITIES

to Aug. 10. Calculations based on early reports from manufacturers applying under the plan indicate that the shortage of metals is becoming so serious that still more drastic civilian curtailment must be effected if war plants are to be kept in full production. Shortages were becoming so obvious, Mr. Howe stated, that the fourth quarter deadline was advanced so plans could be made for allocating

the metals in the last three months of the year.

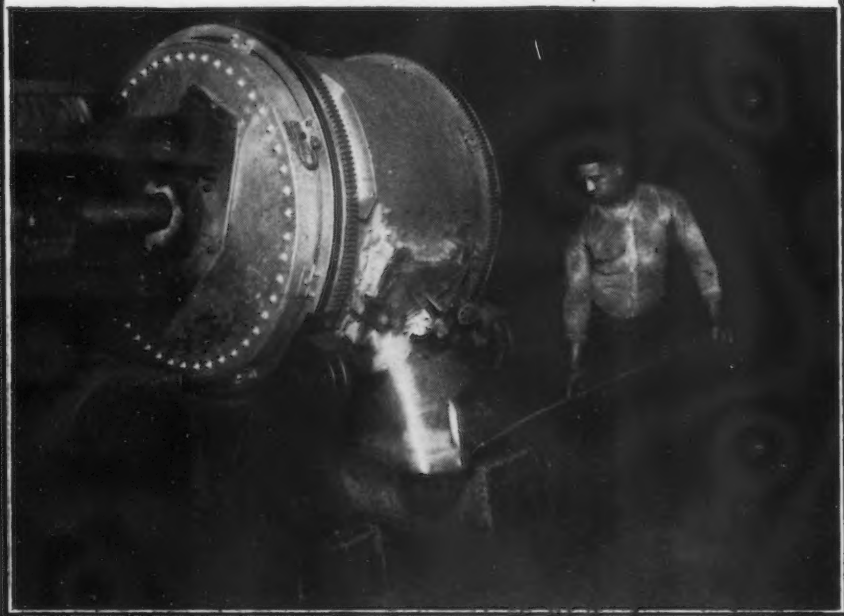
Packing Plant Machinery

• • • Material needed for maintenance, repair and expansion of plants engaged in freezing, dehydrating or fresh packing of fruits may now be obtained on the same ratings as canners are assigned. An amendment to Order

8 WAYS YOU PROFIT WITH A DETROIT ROCKING ELECTRIC FURNACE

- | | |
|--------------------------------------|--|
| 1—Faster Melting. | 5—Saving in Floor Space and Molding Equipment. |
| 2—Lower Metal Losses. | 6—Use of Cheaper Raw Materials. |
| 3—Higher Average Quality of Product. | 7—Less Labor. |
| 4—Less Machine Shop Scrap | 8—Saving of Alloys. |

These are but a few of the many advantages of this remarkable furnace. But don't take our word for these claims—find out for yourself. Let us arrange for you to see a few of these furnaces in operation and talk to their owners yourself. Get the low-down first hand from those who know. Write for further facts today.



DETROIT ELECTRIC FURNACE DIVISION
KUHLMAN ELECTRIC COMPANY • BAY CITY MICHIGAN



PUNISHING WIRE INSULATION: Westinghouse has developed this machine to determine how much punishment wire insulation in military electrical devices will withstand. It is driven by a 1/1000 hp. motor.

P-115 assigns an A-1-a rating for emergency maintenance; A-1-c for replacement, addition or expansion; and A-1-j for normal maintenance, repair and operation. All are subject to specific limitations.

Brass & Bronze Foundries

• • • Brass and bronze foundries were told last week how to make application for allocation of metals by the copper branch of WPB. Application is to be made on two forms—PD-59 and PD-123—which must be filed with the copper branch by the 5th of the month preceding the month for which allocation is requested.

Concrete Burial Vaults

• • • Manufacturers of concrete burial vaults may continue to use metal reinforcing now in inventory until Dec. 31, 1942, under

Amendment No. 1 to L-64, but use is restricted to 15 lb. per vault.

Carbon Tetrachloride

• • • A temporary surplus of carbon tetrachloride for which storage facilities are inadequate has resulted in easing restrictions on its use by Amendment No. 1 to Order M-41 which doubles the quantity certain users may consume between now and Sept. 30.

Soda Ash and Caustic Soda

• • • Increasing supplies of sodium carbonate and sodium hydroxide led WPB to amend Order M-161 on Monday. The amendment, No. 4 to the order, permits unlimited storage by industrial users of these chemicals, removing them from the inventory restrictions of Priorities Regulation No. 1.

Elevators and Escalators

• • • Because adequate priority assistance is available under PRP, WPB last Saturday revoked Orders P-72 and P-92, extending preference ratings for materials going into the production, repair and maintenance of elevators, escalators and dumbwaiters.

Ship Plate Orders

Rerated to AA-1 and AA-2

Philadelphia

• • • Steel mills and district offices in this shipbuilding area report that practically all orders for ship plates have been rerated from A-1-a to AA-2, and where immediate deliveries are required the rating has been changed to AA-1. The change will have little effect on schedules, observers contend.

Tin Content in Wiping Solder

Washington

• • • The permitted tin content of 38 per cent in wiping solder which was to be lowered after July 1, was continued by WPB on Monday until Sept. 1 by an amendment to order M-43-A. Wiping solder manufactured between Sept. 1 and Jan. 1, 1943; for the installation or repair of lead water service pipes may contain 38 per cent tin.

Metallurgists, Here's Something New

• • • With all the enthusiasm customarily expected from Californians, one of the week's announcements included a gem from Southern California indicating that a new iron and steel plant is in the works. The process for the reduction of ores is described as being "based upon the premise that, by the reversal of the polarities of the atoms that comprise the mass, the disruption of the molecular bond or cohesive tension that serves to stabilize the molecular configuration is brought about, and thus, by the simple procedure of reversing the conditions that brought about the union of the atoms of the metallic and oxygen, liberate the oxygen atoms for combustion or reassociation with the carbon used in the reduction formulae." This is only one paragraph of many in the same vein. Inquiry at Washington brought the word that no such plant is contemplated by government officials.



TAKE the case of the large welding rod manufacturer. In this plant the coating is cleaned off one end of welding rod with wire brushes to provide a bare metal contact for the holder. This manufacturer devised an ingenious method of reclaiming the brushed off coating by passing it over a Dings Magnetic Separator to remove any contaminating wire brush bristles.

There are 1001 places like this where Dings Magnetic Separators can be employed to salvage materials and speed up War Production. To mention a few of the more common applications: taking iron out of non-ferrous scrap (even that which is very intimately entangled); reclaiming iron from slag; taking iron out of used rubber, dump piles, foundry sand, cullet, and many others.

Look around for the salvage opportunities offered by separators in your plant. It will pay you well.

Write to Dings today and ask for MAGNETIC ALCHEMY BULLETIN.



Dings
MAGNETIC
SEPARATION

DINGS MAGNETIC
SEPARATOR CO.

516 E. Smith Street,
Milwaukee, Wisc.

Formula Established For New Lines of Material

••• Methods of pricing which manufacturers may use to establish ceilings for new lines of consumer goods and building materials introduced after April 1, last, and to which the usual March base for ceiling prices is therefore in-

applicable, were established by a new OPA order last week.

Tens of thousands of articles are affected by the regulation, which applies to specified building materials and consumer goods other than apparel. It goes into

effect on Aug. 1 for all sales except those to the government agencies for which the effective date is Sept. 1.

Prices for such new lines are to be fixed according to a formula which uses March prices of comparable articles as a base. The new pricing methods must be applied by manufacturers to all new goods introduced after April 1, unless maximum prices for them were finally determined under the General Maximum Price Regulation already in existence. If such prices were finally determined for them they must stand and these "final" prices must be reported to the OPA by Aug. 20.

Wholesale, jobber and retail prices for the new products covered by the regulation will not be affected by it.

From the new method many articles such as radios, refrigerators, and cast iron soil pipe have been omitted because their prices are already covered by separate regulation or shortly will be so covered.

Before offering for sale a new article whose price has been determined by the new methods the manufacturer must file a report with OPA in Washington describing the article and the methods by which its price was computed. Fifteen days later he may offer it for sale if OPA does not object, though his price may be subject to change—not retroactive—by OPA at any time.

Although the new regulation takes effect Aug. 1, the reporting and waiting provisions of the regulation will not become effective until Sept. 25. Meanwhile OPA will allow tentative pricing of those articles introduced in August, so that manufacturers need not suspend all introduction of new goods while adjusting their pricing to the new standards.

In pricing a new article the manufacturer must apply the following standards:

1. If only minor changes are involved from an article already being sold, the producer must set a ceiling price for the new article which is the same as the maximum price for the similar article. Minor changes are those which do not reduce the cost of materials or prevent the new article from offering fairly equivalent serviceability.

2. If the new article results from substantial changes compelled by shortages of material or parts used in the original article, the manufacturer must use as his maximum price the ceiling price for the original article, plus or



● Recent arrests by F. B. I. agents of saboteurs and their accomplices, is convincing proof of a constant threat to great American industries and other important properties and plants. In defeating saboteurs A. A. I. Automatic Alarms provide a modern, fool-proof method of detection . . . giving instant warning of danger and directing guards to actual zones of disturbance. Operating on a principle of sound detection, Automatic Alarms are used in connection with standard type, industrial wire guard fences . . . may be installed by plant engineers . . . require little or no maintenance . . . and assure the highest degree of efficiency at minimum cost. Every individual upon whom responsibility rests for plant or property protection should acquaint himself with the protective potentialities of Automatic Alarms and its adaptability to his particular industry.

Licensed under DuPont
and Astatic Patents



Explanatory Literature
is Available upon Request

AUTOMATIC ALARMS Incorporated

831 Market St.

YOUNGSTOWN, OHIO, U. S. A.



AWARD FOR IMPROVEMENT: As part of a program designed to speed war production, a radio workers' committee in one of General Electric's war factories has arranged for the award of this blue silk banner to electronic tube sections showing the greatest weekly improvement in work. Here Helen Paska is shown with the banner to be awarded periodically by R. C. Robinson, left, G. E. superintendent.

minus any increase or decrease in the direct unit cost of production resulting from the change.

3. If the new article cannot be priced under (2) above, the manufacturer must use the following formula:

(a) He determines the direct cost per unit of the new item, using March labor rates and March costs of materials unless OPA has rolled back the material price in which event he uses the lower price.

(b) Selects from his line of comparable articles already having maximum prices, one which has a March direct cost immediately higher and one which has a direct cost immediately lower.

(c) He then averages the mark-ups (margin by which his maximum selling price exceeds his direct cost) for the two comparable articles both in dollars and cents and in percentage.

(d) Whichever of these average mark-ups yields the lower price is then applied to the direct cost of the new article and the resulting price is the maximum price.

Aluminum Cuts Delayed

••• Contemplated reductions in prices of fabricated aluminum products to become effective Aug. 1 have been postponed because of complexities of the problem involved which have not yet been resolved, Price Administrator Leon Henderson announced July 29.

Brass Mill Product Prices

••• Makers of brass mill products were given a formula by OPA for determining maximum prices for items which cannot be

priced under Section 1499.2 of the General Maximum Price Regulation. The section provides that the maximum price for a brass mill product shall be the highest price charged by the company for the product or a similar commodity in March, 1942, or, if the company had no such price in March, the maximum price of its most closely competitive seller of the same class for the same or similar commodity.

On new items, to eliminate the necessity of authorizing and instructing brass mills in each separate instance in which they desire to establish maximum prices for such items, Order No. 46 has been issued. It provides that a brass mill may determine the maximum price for such an item by applying the same pricing formula or method of calculating prices which it would have used on March 31, 1942. In applying the



IT'S ALL THE SAME TO MATHEWS



● **HIGH PRESSURE PRODUCTION SCHEDULES** are a lot easier on workers in a Mathews-equipped plant.

Day and night . . . one shift or three . . . five days a week or seven, a production line coordinated with a Mathews Conveyor System lessens the fatigue of workers . . . speeds up man and machine output . . . gets work done faster and better!

DOUBLED CAPACITY FOR WAR PRODUCTION

Stepping up our productive capacity month after month has barely enabled us to keep pace with mounting war orders. As long as this condition exists, it becomes increasingly difficult to meet civilian requirements. Our one big job is the handling of war material. That job must come first.

MATHEWS CONVEYER COMPANY
ELLWOOD CITY, PENNA.

Field Engineers and Sales Offices located in 30 Industrial Centers.

pricing formula, a brass mill is required to use the same unit cost factors (that is, the same wage and machine hour rates, the same per pound prices of materials, and the same unit overhead) and the same percentage of profit over costs, extra charges, discounts and allowances, which it would have used on March 31, even though such unit cost factors may have increased since that date.

Brass mills, under the order, are

required to report to OPA any prices calculated by the formula within 10 days after they are determined.

Schedule on Cresylic Acid

••• A reduction in the price of imported cresylic acid was announced July 31 by OPA when it issued Price Regulation 192. The order provides an elastic pricing formula which establishes the

ceiling price for sales by importers at approximately \$1.10 per gallon.

New Order Affects Alaska

••• All price-regulated commodities imported into Alaska and re-sold there were brought under a cost-plus pricing method by Maximum Price Order 194, announced July 30. The new regulation supersedes Amendment No. 1 to Supplementary Regulation No. 13. Licenses are granted by the new order to all persons subject to it.

Contract on Standards

••• Development of standards which will save materials, make fuller use of the nation's production facilities, and make price control more effective by pegging price to quality will be spurred by a new contract between the government and the American Standards Association. Under the terms of the contract, the association will develop emergency standards in connection with WPB and OPA wartime supply and price control measures and will be reimbursed by the government for the actual cost of the work involved. The contract is limited to \$90,000 in any one fiscal year; \$60,000 is to be provided by WPB and the remaining \$30,000 by OPA.

Firm's Appeal Is Studied

Washington

••• OPA has authorized the Solar Mfg. Corp., Bayonne, N. J., to continue in effect the prices on machinery and parts it quoted on July 21, pending disposition of the company's protest against provisions of Maximum Price Regulation No. 136. The regulation covers machinery and transportation equipment.

Century Steel Co. Denied Aid

••• Century Steel Co., of Chicago, has been denied permission by OPA to charge prices higher than those established in Revised Price Schedule No. 49, which covers sale of iron and steel products by warehousemen.

The company, in a petition had sought permission to charge prices in excess of those provided in the schedule for 1275 tons of iron and

FIDELITY SINFRA Triple-Head WIRE COVERING MACHINE . . . for triple covering of wire

The FIDELITY Sinfra Triple-Head Wire Covering Machine—three knitting heads in series—knits three cotton coverings on wire up to #6 gauge—1200 to 1500 feet per hour—speeds production—low power consumption.

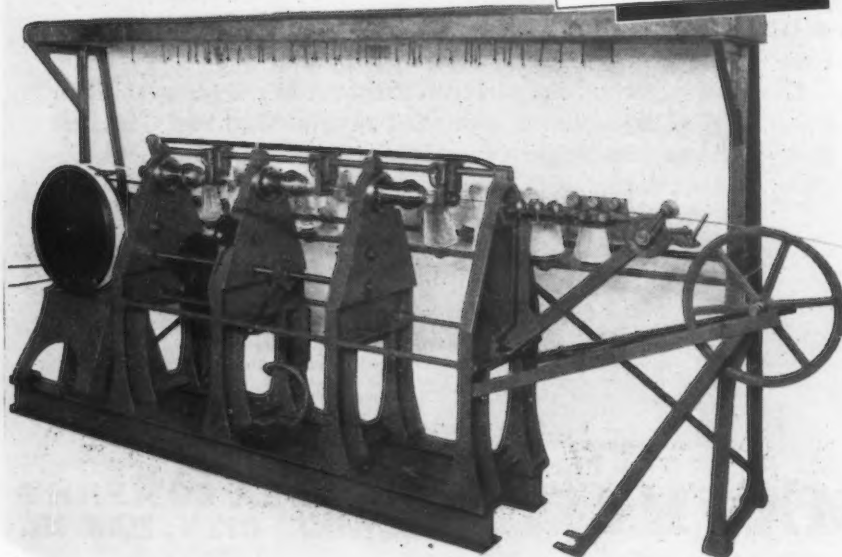
Wire fed over straightening rolls through three knitting heads in series—each head knits one covering. The covered wire then passes on to a 20" or 36" capstan take-off. Separate haul-off reel stand—maximum 40" O. D., 40" traverse, 1000-lb. capacity—simplifies removal of finished product—saves floor space.

Automatic electric stop-motion for each yarn—improved knitting head and needle design ease removal and replacement—knitting direct from large cones eliminates small package winding—and quiet operation reduces operator fatigue.

Compact design, high rate of production and low power consumption make FIDELITY Sinfra Triple-Head Wire Covering Machines time- and cost-savers for you. . . Write for Bulletin.

SPECIFICATIONS FIDELITY Sinfra Triple-Head Wire Covering Machine	
No. Covers Knitted	3
Rate of Production	1200'-1500' per hour
Size of Wire Covered	Up to #6 Gauge Bare Copper Wire
Power	1 H.P.
Floor Space (Knitting Unit)	12' x 4'
Haul-off Reel Capacity	Max. 1000 lb. Max. 40" O.D.—40" Traverse
Yarn	Knit Directly from Large Cones

FIDELITY MACHINE COMPANY
3908-18 FRANKFORD AVE., PHILADELPHIA, PA.



Lend-Lease Taking 12% of War Output

• • • About 12 per cent of the country's military output is going to the United Nations on lease-lend transfers, latest reports show. Total lend-lease aid up to June 30 amounted to \$5,205,000,600. For June the figures amounted to \$708,000,000. The government has issued the following details:

Tanks and planes — being shipped in quantities amounting to much more than 12 per cent. (Up to June 30, the amounts bought directly exceeded the quantities transferred under lend-lease.)

Industrial materials — \$818,000,000 worth shipped since the program's inception.

Agricultural products — \$841,000,000 worth shipped.

Repairs to Allied craft, ferry planes and provisionment of shipping — have amounted to \$596,000,000.

steel products which it had purchased in 1941 at a total cost exceeding ceiling prices. The company said that if it sold the 1275 tons at established maximum prices, a loss of \$80,505 would be sustained.

In denying the relief asked in the petition, the OPA said that the company was engaged in 1941 in the "speculative" business of buying culls and rejects from steel companies, having them converted into sheets at a total cost higher than new sheets, and then selling them to export buyers at a time when the priorities of defense work had created a heavy outside demand for sheets.

Higher Prices for Machine Tools Banned

Washington

• • • Gould & Eberhardt, Inc., Newark, N. J., Norton Co., Worcester, Mass., and the Smalley General Co., Bay City, Mich., machine tool builders, in Amendments 13, 14 and 15 to Price Schedule 67 issued July 31, were directed by OPA not to sell certain machine tools above certain stipulated prices.

Gould & Eberhardt was prohib-

ited from selling at a price higher than \$625 any of its 150 universal tables for 16-in., 16/20-in., 20-in. or 20/24-in. industrial shapers to be manufactured by American Type Founders, Inc., Elizabeth, N. J.

The Norton Co.'s maximum price for each of 150 model No. 26 Hyprolap machines was fixed at \$7,290 to be manufactured for Norton Co. by subcontractors

other than Dennison Mfg. Co., Framingham, Mass. However, OPA permitted the same price to be charged by Norton Co. on model No. 26 Hyprolap machines in deliveries in compliance with the WPB machine tool order, E-1-b, for machines manufactured either by Norton or by Dennison, in substitution for any one of the 150 machines to be delivered by subcontractors other than Denni-

AMPCO CASE HISTORIES



You get what you pay for. An important company engaged in producing war tools substituted a cheaper bronze for the AMPCO METAL which was specified by the chief engineer for certain metal parts—and immediately set up this chain of unfortunate incidents. Metal failure resulted—machines came off the production line—time and money were lost. Fortunately, replacement could be made with parts of Ampco Metal. The trouble cured itself.

Ampco Metal is a quality bronze — sometimes higher priced in first cost — but lower in the long run, for it gives longer performance life and better service. Today cheapness is not an asset; the weapons of war and the tools that make them must function perfectly. Only strong, rugged Ampco bronzes serve well in certain vital places. Ask for catalog 22 that tells about this remarkable bronze alloy.

AMPCO METAL, INC.

DEPARTMENT IA-8

MILWAUKEE, WISCONSIN



son. The condition attached to the foregoing price is that an equal number of machines manufactured by subcontractors other than Dennison are sold at the list price of \$7,025 in effect for these machines on Oct. 1, 1941.

Smalley General Co.'s ceiling on some of its threadmill machines for gun tube or breech ring, to be manufactured by the Valley Iron Works Co., Appleton, Wis., was put at \$14,528 each.

Bituminous Coal Prices

• • • An independent maximum price schedule was established by OPA for bituminous coal for direct use in vessels as "bunker fuel." The regulation becomes effective Aug. 1, and applies to all persons who supply bituminous bunker fuel to vessels on the Great Lakes or at tidewater. The new regulation is known as Maximum Price Regulation 189.

Instructions for Handling Explosives Are Issued

Washington

• • • Rigid instructions governing the storage, handling and transportation of explosives to prevent disasters in coal and metal mines were issued on Tuesday by the Secretary of the Interior. The instructions are also designed to help prevent sabotage. Anyone violating the regulations may have his federal license revoked, be refused a renewal of his license or may be prosecuted under the federal explosives act under which 145,000 concerns are licensed. Approximately 7000 metal mines are governed by the terms of the instructions. Violators may also be subjected to a \$5,000 fine or imprisonment for a year, or both.

The Rochling Wide Strip Mill

(CONCLUDED FROM PAGE 63)

pendent of the number of stands; the first stand can be run at a higher speed than in the continuous mill, which reduces heat losses. In the plant sketched, the feed rate at the first stand is 12 ft. per sec., and the speeds of the second and following stands are between 12 and 15 ft. per sec. The greater part of the time the strip is passing through the mill it is in the coiling furnaces. With these speeds there is no difficulty in superintending the running of the mill, control being safely and efficiently exercised by one man.

It would appear that this report for the first time gives details of one direction of progress in Germany towards evolving a European counterpart of the large wide-strip continuous mills, which the principal American steel companies have installed in recent years. There has been much speculation of what progress has been made in the Reich, especially by Röchling, whose name has been for some time associated with German developments in this direction. A close study of this report shows that the solution offered by Röchling, as far as details are divulged, is only a partial one, and does not go beyond a rather complex adaptation of the principle of the semi-continuous mill.

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The BEARING that LUBRICATES itself





Oil is the life blood of every motive unit. In order to gain smooth, quiet operation; long, satisfactory bearing life, we must have the right amount of oil . . . in the right place . . . at the right time.

Johnson LEDALOYL bronze bearings provide this type of performance. Evenly distributed over all surfaces of every LEDALOYL bearing are millions of tiny, evenly spaced pores. Each of these pores serve as miniature oil reservoirs. Heat, generated by the turning of the shaft draws the oil from the pores into the bearing area. Thus a thin, protecting film of lubricant separates the shaft from the bearing, reduces friction to a minimum and assures long, satisfactory life. When the shaft stops, the oil is absorbed by the bearing.

Johnson LEDALOYL Bearings are ideal for any place where lubrication is hard to achieve, likely to be neglected, or where excess oil might damage goods in process. A request, will bring the complete story and the actual operating facts concerning LEDALOYL. Write today.

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This Week's Priorities And Prices

Urgency standings take precedence over rating AAA, AA-1, etc. (T-639)

Many copper items are added to the list of products which can be made for the armed forces, and which were not heretofore on the "military exemption" list.

Communications companies are granted higher ratings for copper used for operating construction, maintenance and repair, by amendments to orders P-129 and P-130. (WPB-1609)

Iron and steel plate deliveries are restricted to ratings of A-1-k or higher, with certain exceptions, in an amendment to M-21-c. (T-630)

Replacement parts for furnaces may be manufactured over and above quotas established by L-22, according to an interpretation of the order. (T-634)

Foreign silver became a war metal by order M-199 which directs supplies into essential production. (WPB-1615)

Aluminum price cuts, originally scheduled for Aug. 1, have been postponed (OPA-406)

Electric meter output curtailed under L-151 (WPB-1626)

Century Steel Co., Chicago, denied price increase over those established in schedule 49. (OPA-431)

Hand elevators exempted from production and delivery restrictions of L-89 (T-645)

Brass and bronze foundries told how to make application for metals for processing. (T-641)

Brass mill prices which cannot be determined under

Section 1499.2 can be determined by order 46, Section 1499.3 (b). (OPA-393)

Canners' preference ratings for material and machinery needed for plant repair and extension, have been assigned also to persons engaged in freezing, dehydration or fresh packing of fruits, by an amendment to P-115.

Laundry and dry cleaning machinery which cannot be used effectively by the purchaser unless rebuilt or reconditioned is included in restrictions of order L-91, by Interpretation No. 1. (T-623)

Carbon Tetrachloride supplies to holders of B-2 ratings doubled by Amendment No. 1 to Order M-41 (T-650)

Metal foundries needs not file form PD-25-a on metals for processing, but must file it for purchases of metal for operating repair and maintenance supplies exceeding \$5,000 per quarter. (T-640)

Consumer goods and building materials manufacturers are given methods for determining maximum prices for new lines, in regulation 188. (OPA-369)

Sellers of solid fuels given broader method of applying for relief, in Amendment 3 to regulation 121. (OPA-395)

Monthly lead pool revoked. (T-663)

■ ■ ■

For copies of above announcements address Division of Information, WPB (or OPA), Washington, giving announcement number as shown in parentheses after each paragraph. (For example, WPB-600 means announcement 600 issued by the War Production Board.)

• • •

Revisions to The Iron Age Priorities Guide

• • • The following data, together with all intermediate weekly revisions in THE IRON AGE, should be added to THE IRON AGE Priorities Guide published with the issue of June 4 to bring the Guide up to date.

Under "M Orders," page 6, add:

M-9-c...Amendment No. 4 (7-29-42) adds items to military exemption list.

M-15-f...Prohibits use of rubber cement for specific products (7-31-42).

M-38-j...Monthly lead pool, revoked (8-3-42).

M-21-e...Amended order restricts deliveries of steel plate to ratings of A-1-k or higher (7-28-42).

M-27...Extended until revoked (7-28-42).

M-31...Extended until revoked (7-28-42).

M-41...Amendment No. 1 (8-1-42) doubles quantity of carbon tetrachloride available to holders of B-2 ratings. Expires Sept. 30, 1942.

M-124...Amendment No. 5 (7-30-42) tightens rubber thread order.

M-148...Amendment No. 2 (7-29-42) contains a list of materials to be given preference in exports to the other American republics.

M-161...Amendment No. 4 (8-3-42) removes inventory restrictions of P.R. No. 1 on caustic soda and sodium hydroxide.

M-171...Amended (8-1-42) to permit stockpiling of chlorate chemicals and increase unrestricted monthly deliveries from 10 to 25 lb.

M-199...Restricts civilian use and directs foreign silver supplies into essential production (7-29-42).

Under "L Orders," page 19, add:

L-22...Interpretation No. 1 (7-29-42) makes it clear that replacement parts for furnaces may be made in excess of quota restrictions set by L-22.

L-30...Amendment No. 5 (7-31-42) extends to Aug. 15 restrictions on use of iron, steel and zinc in kitchen and household articles.

L-151...Curtails output of electric meters (7-31-42).

L-64...Amendment 1 (7-27-42) permits use in restricted quantities of metal reinforcing now in inventory, in concrete burial vaults, until Dec. 31.

L-67...Amendment No. 2 (8-1-42) permits manufacture of gang mowers for government agencies, at second quarter rate.

L-89...Amendment No. 1 (7-31-42) exempts hand elevators from production and delivery restrictions.

L-91...Interpretation No. 1 (7-25-42) declares order to apply to machinery which cannot be used effectively by the purchaser unless rebuilt or reconditioned.

Under "P Orders," page 13, add:

P-115...Assigns preference ratings of A-1-a, A-1-c and A-1-j to fruit freezing, dehydration and packing industries.

P-129...Amended order raises ratings for copper used by communications companies from A-3 to A-1-j (7-28-42).

P-130...Amended order raises rating for copper used by telephone companies in operating construction from A-3 to A-1-j (7-28-42).

Under "E Orders," page 32, add:

E-1-b...Interpretation No. 3 (7-30-42) states that urgency ratings take precedence over ratings of AAA, AA-1, AA-2, etc.

Under "L Orders" in their proper places use the following:

L-23...Amendment No. 2 (7-20-42) permits cooking stove manufacturers to base iron and steel requirements on a quarterly rather than a monthly basis.

L-54-e...Amendment No. 1 (7-16-42) makes clear that production quotas for office machinery under order do not include machinery not covered by distribution restrictions and deletes the respective coverage of orders L-54-a and L-54-c.

L-157...Simplifies design of hand tools, concentrating on fewer lines with use of less critical materials (7-20-42).

Canada to Step Up Tank Production This Year

Ottawa

• • • In a forecast of Canada's war industry, C. D. Howe, minister of munitions and supply, stated that before the end of this year Canada will be turning out 500 tanks a month, the majority to be the highly-efficient "ram" type. Canada now possesses the second largest tank building arsenal in the North American continent he stated. Also, before the end of this year, Canada's airplane industry will have com-

pleted its switch-over from the production of training planes to the manufacture of combat planes. He stated that plants which have been tooling up for this change are now almost ready to recommence operations and he estimated that assembly line production by the close of the year will be approximately 800 planes per month.

Mr. Howe stated that although the steel situation is "difficult" there has been no cause as yet of having to slow down production schedules in any war industry because of shortages.

Steel Co. of Canada at Capacity but Will Expand

Toronto

• • • Ross H. McMaster, president, Steel Co. of Canada Ltd., stated that steel making operations by his company have continued at full capacity, and, although supplemented by purchases of steel in ingot and billet form, semi-finished steel available has been insufficient to keep all finishing mills fully occupied.

Arrangements have been made with the Canadian government for construction of a large electric furnace and a Bessemer converter. Mr. McMaster stated that combined, these will provide added ingot capacity of approximately 250,000 tons per year, which can be rolled into merchantable form without any additional expenditure for mill equipment. It is hoped the electric furnace will be completed and in operation by December this year.

BREN GUN CARRIERS: Australian locomotive plant turns out Bren gun carriers alongside its locomotive erecting line. The carriers are powered by V-8 engines and protected by bullet proof steel.



War Shipping Board Aided on Steel by Order

Washington

• • • The War Shipping Administration on Tuesday was added to the list of government agencies for which iron and steel may be used to manufacture articles prohibited for civilians by WPB Order M-126. At the same time WPB also issued as an amendment to the order a revised military exemption list.

Articles on this list may be manufactured without restriction under contracts with Army, Navy and Maritime Commission. Appended to the list is a further group of articles which may be manufactured without restriction for the war agencies named until Sept. 3. By Sept. 3 a further determination will be made as to which of them should be placed on the permanent exemption list.

B. D. Snell Promoted in Canada

Ottawa

• • • Byron D. Snell has been appointed deputy machine controller to succeed R. T. Wise, who resigned recently because of the pressure of his duties as vice-president of Cutting Tools & Gauges Ltd., a government-owned company.

July Ore Movement Breaks All Previous Records

Cleveland

••• All existing records for monthly movement of iron ore down the Great Lakes were broken in July, as the ore fleet transported 13,333,751 gross tons of ore to U. S. ports, and 71,657 gross tons to Canada. According to the Lake Superior Iron Ore Association, the July record broke the previously existing record of 12,677,356 gross tons moved in May, and the 1941 record of 11,496,303 gross tons set in August. The heavy July movement brought a total tonnage of ore carried down to U. S. ports on the lower lakes to 47,095,466 gross tons, which was over 7,000,000 tons ahead of the 39,988,498 gross tons moved up to Aug. 1, 1941. Since the goal for this year's ore movement has been set at some 90,000,000 gross tons, the favorable operations by the lake carriers thus far indicate that this goal will be realized.

20,000 Additional Workers Needed by Akron War Plants

Akron, Ohio

••• Akron's expanding war plants are expected to require some 20,000 additional workers within the next few months, according to the U. S. Employment Service office here. W. B. Westenbarger, office manager of the Employment Service, pointed out that over 90,000 people are now employed in war work in Akron including 18,000 women. He emphasized that the major shortage is in skilled trades and that unskilled workers could easily be secured from nearby areas.

Laying of New Pipe Line Under Way in the Southwest

Washington

••• Actual laying of pipe for the big 24-in. line from Texas to Illinois to help supply the East Coast petroleum requirements next winter gets under way this week in the Southwest, it was announced on Monday by the Office of the Petroleum Coordinator for War. It is reported that 692 carloads of pipe have been shipped from the Lorain, Ohio, mill of National Tube Co.

Screw Thread Standards Out for Industry Approval

Washington

••• Recommended Commercial Standard for Screw Threads and Tap Drill Sizes (TS-3310) as approved by the Standing Committee July 15, has been issued by the National Bureau of Standards in mimeograph form for distribution to producers and users of screw threads for written acceptance.

The purpose of this standard is to present the essential specifications, definitions and dimensional

data on screw threads and tap drills which are recorded more completely in National Bureau of Standards Handbook H28. Additional tables have been included for all drills which fall between the limiting dimensions of the minor diameter of the threaded hole for American coarse, fine, extra-fine and the 8, 12 and 16-pitch thread series.

Copies of the recommended standard may be obtained from the Division of Trade Standards, National Bureau of Standards, Washington, D. C.

Flashes from Other Countries

••• Stockholm—Because Germany has fallen behind in promised deliveries of coal and coke, and the situation is growing worse, the Swedish Fuel Commission has been paring allotments to industries sharply.

••• London—In the drive to coordinate production of British West Africa, Free French Africa and the Belgian Congo, considerable emphasis is being put on the tin industry which is expected to produce 42,000 tons this year. Biggest expansion in tin production will come from the vicinity of the Bauchi Plateau. Nigeria's output of tin this year will be around 17,000 tons.

••• Buenos Aires—Argentina is beginning to safeguard its stocks of iron and steel. A decree controlling sales and shipments has been issued. A steel rationing committee has been named.

••• Mexico City—Last Friday in Washington, Mexican officials received assurances of the desire of the United States to fill a request for 1500 trucks, but it was not determined immediately whether orders could be placed at this time.

••• London—The Japanese aluminum industry has been placed under closer control, with other industries.

••• Moscow—Russia is reported to be exploiting new lead deposits on the eastern slopes of the Pamir Mountains in central Asia.

••• Stockholm—Plans are being made for working deposits of molybdenite at the Algruva mine, Lillharad. Herman Eriksson, Minister of Commerce, denied reports that the ore would be exported to Germany, saying that Sweden needs all supplies for her own use and no such export licenses can be granted.

••• London—The shortage of coking and gas coals in Germany is reported causing serious inconvenience, especially in the eastern provinces. As the output of good coking coals cannot be increased, coking properties of poorer coal are being improved by mixing and blending of coals.

••• Berlin—High speed steel may be used only for the manufacture of steel cutting tools, and these in turn may only be made of such steel if they were so made before Nov. 1, 1939, according to a recent order.

••• London—The Allied defeats in Egypt jeopardize shipment of Turkish chrome ores, it is feared, with the Mediterranean pretty well closed to sea traffic and the Suez threatened.

••• Berlin—Germany anticipates long term fuel economies through long-distance heating by steam, hot water, etc. In one big plant serving a large town 260,000 tons of coal a year is reported saved, with additional labor, transport and storage economies. It is planned to build town heating plants on a large scale after the war.

••• London—Germany is reported to have placed orders amounting to 2,500,000,000 marks with Dutch firms, the lion's share going to shipyards, with the machinery industry, electrical works and sheet mills also receiving large contracts.

••• Berne—Switzerland plans to demolish old and non-competitive hotels for scrap.

Production Marks Set in Several J. & L. Departments

Pittsburgh

• • • Jones & Laughlin Steel Corp. made new production records for July, 1942, in pig iron output of its Eliza furnace, the steel output of its Soho department, Pittsburgh, its steel plate output at its Pittsburgh and Otis works, and its steel products rolled on its No. 18 rolling mill. In addition, the company has made new records in its output of shell forgings, shells, junior beams, seamless pipe, straightened and cut wire. Of these records, the most interesting one appears to be the one set at the Eliza group of blast furnaces since one of these units is air conditioned.

Tool Builders Concerned Over Allotments of Steel

Cleveland

• • • Machine tool builders are gravely concerned over Washington's attitude in allotting them varying amounts of steel for the third quarter for in some cases, leading machine tool builders have been allotted about 50 per cent of their steel needs and even at that their priorities do not assure them of getting the steel they need. Meanwhile, anti-friction bearing manufacturers have only been allowed 58 per cent of the third quarter steel needs. This will also hurt machine tool construction. Aside from that, motors have been denied the industry and machine tools are being shipped with used motors. Predictions are being freely made here that many machine tool plants throughout the country will be idle within 30 days unless the industry is granted some relief. Strangely enough, Washington authorities are still pressing for deliveries of new machine tools.

Union Accepts New Terms

Pittsburgh

• • • The CIO Electrical Radio and Machine Workers, Local 601, last week accepted new contract terms, including a 5½c. hourly wage increase proposed by the Westinghouse Electric & Mfg. Co. The acceptance affects more than 20,000 members and establishes a basic wage rate of 78½c. an hour for labor.



OLD SLOGAN REJUVENATED: Packard's famous slogan "Ask The Man Who Owns One" has just been given a war production twist. Now it reads "Ask The Man Who Wears One," referring to the war worker proudly displaying his "Work To Win" badge.

Couch and Sofa Bed Production to Be Halted

Washington

• • • WPB on Tuesday halted production of studio couches and sofa beds containing iron and steel as of Nov. 1 and mattresses containing the metal as of Sept. 1, in a complete revision of order L-49. The revised order also established quotas for the production of bed springs and sets up regulations governing the renovation of mattress springs, lounges and other products.

House Committee Gives Ship Program Figures

• • • A 360 per cent increase in naval ship construction over that of a year ago has been reported by the House Naval Committee. A total of 3230 combatant, auxiliary, patrol and mine craft, were reported building as of June 30, compared to 697 a year ago. A comparison of ships completed with ships scheduled during the fiscal year of 1941 shows:

	Scheduled	Completed
auxiliaries	9	10
patrol craft . . .	133	143
mine and district craft . . .	394	280
Construction time has been cut as follows (in months):		
Pre-emergency Present		
	average	average
battleship	42	36
aircraft carrier . .	45	17.3
heavy cruiser . . .	36.4	22.7
light cruiser . . .	38.8	22.3
destroyer	27.2	11.6
submarine	21.2	11.5

Navy Commends Buffalo Plants for Subcontracting Plan

Buffalo

• • • A three-week-old plan which has resulted in the award of more than \$3,000,000 worth of contracts to local industries and has turned more than 30,000 hours of work out of idle critical tools in the area has been commended by the Navy Department and all naval material activities have been requested to adopt similar plans.

The plan is the invention of Lieut. Comdr. Hayden Crocker, WPB naval advisor for the Buffalo and Rochester areas. It consists mainly of two large blackboards, one labeled "Subcontractors Wanted" and the other "Idle Critical Tools."

The boards provide instant reference for war contractors requiring certain tools, listed in code numbers, and serve as "trading posts" for machine shop owners looking for additional contracts to provide round-the-clock operations for their plants.

Government Takes Lake Boats

Buffalo

• • • Six package freighters of the Great Lakes Transit Corp., Buffalo, have been taken over by the War Shipping Administration, it was announced last week. These are in addition to four of the company's ships, formerly in the grain trade, taken over a month ago. Four remaining ships of the company in the grain trade will be allowed to continue in service.

Steel Corp.-Steel Workers Negotiations to Continue

Pittsburgh

• • • Contract negotiations between representatives of the CIO United Steel Workers and representatives of U. S. Steel Corp. subsidiaries which opened here last week, were adjourned until Thursday of this week after demands had been presented by the union similar to the concessions awarded "Little Steel" by the War Labor Board. These included a wage increase of 44c. a day, check-off of union dues and maintenance of membership provision as well as revision of existing grievance machinery. The United Steel Workers, however, also asked for elimination of all geographical wage differentials, which point was not included in the "Little Steel" dealings.

500 Import Items Go on Shipping Priorities List

Washington

• • • WPB on Monday announced that it had placed nearly 500 items of import on an Emergency Shipping Priorities List to guarantee these products preference treatment in the assignment of cargo ship space. The listing is designed to help in the importing of raw materials of an essential nature to munitions manufacture. Heretofore for over a year priorities on imports have been in effect but after essential cargoes had been moved, non-priority cargoes could be loaded.

The War Shipping Administration has agreed to limit the cargo to be carried on ships under its control to the Emergency Shipping Priorities List, though lower rated cargo may be moved from the Caribbean area, United States possessions, Canada and Newfoundland where shipping space has not been exhausted by items on the emergency list.

Articles listed of importance to the iron and steel and metalworking industries are:

Abrasives; corundum ore, emery ore, grinding pebbles; cresylic acids; anti-mony ore and metal; babassu oil; bauxite; beryllium ore; bismuth and compounds; braxilian pebble; bronze scrap; cadmium metal and flue dust; chromite; cobalt ore, concentrates and metal; columbian ore and concentrates; copal gums; copper, ores (19 per cent and over copper content), otavi ore (lead and copper), pyrites ore, concentrates, matte, blister, metallic, and scrap, unalloyed No. 1 and No. 2; corundum ore; cryolite; diamond bort, manufactured (dia-

mond dies); diamond dies; diamonds, industrial (glaziers', engravers', and miners); ferro-nickel; graphite flake; flint-spar; flake, graphite; crude gypsum; ilmenite sand; iron ore; iron and steel scrap; lead, bullion, ore and matte, metallic, scrap and dross; manganese ore, 35 per cent and over, battery and ferro grades; mercury ore (cinnabar); mercury; nickel ore, matte and speiss; neatsfoot, oiticica, palm, palm kernel, rapeseed, sperm, tung and whale oils; platinum concentrates and metals including ruthenium, rhodium, iridium, palladium and osmium; rutile sand and ore; salt, solar; selenium and salts; shellac and button lac; sillimanite and kyanite; strontium, metal and compounds; tantalite; theobromine; tin, ore, metal scrap, metallic, scrap plate; uranium ore; vanadium ore and concentrates; zinc ore, concentrates; metal scrap and dross; zirconium sand and ore including baddeleyite, brazilite and zircite.

Copper Controls Changed In New Orders by WPB

Washington

• • • Changes in the copper control orders, M-9-a and M-9-b, were announced on Monday by WPB. Order M-9-a as amended places all deliveries of copper under complete allocation by the director general. Brass mills and wire mills are subject to the same restriction. Dealers supplying brass mill and wire mill products to the industry may make delivery only when the order bears the appro-

priate allocation classification and purchaser's symbol and bears a preference rating of A-1 or higher.

The control of allocation of copper to foundries and ingot makers is transferred from M-9-a to M-9-b and some procedural changes are made. No new forms are called for by either order.

Strike Hits Pittsburgh Plant

Pittsburgh

• • • There was a one-day strike at the North Side La Belle plant of Crucible Steel Co., with the CIO United Steel Workers finally accepting a plan of conciliators to return to work pending settlement of grievances. Apparently, the men walked out when the company decided to suspend operations of its 9-in. mill for a week due to lack of orders and shortage of materials, thereby throwing about 50 men out of work. Accordingly, 1100 employees walked out.

Some 1000 men left their jobs at the huge ordnance works at Point Pleasant, W. Va., for some unknown reason on Aug. 3.

A Few Current Trends Explained in Simple Terms

• Changes have been occurring at a fast rate in recent weeks. Here's a summary of some of the trends, with background explanation of why they are considered necessary.

• • • PRP is a WPB attempt to get sufficient information from industry about inventory, products manufactured, rate of material consumption, estimated requirements, previous quarter shipments, and unfilled orders, together with the kinds of material consumed, and the use to which the product is put to get a combined materials bill for war and essential civilian needs. Ratings are assigned on the basis of relative importance of the product to be manufactured and for a definite quantity, usually three months' supply of materials.

• • • THE OBJECT of the combined materials bill is to strike a balance between supply and demand and to furnish a basis for policy decisions on how much should be manufactured of each finished product, military or civilian.

• • • RATINGS are determined by the rating pattern which unfilled orders make. Unexplained material requirements or excessive inventories may be reasons for deductions from materials requested. If a manufacturer of combat items has unfilled orders which are 80 per cent A-1-a, he is likely to receive 100 per cent of the material and the A-1-a rating to get them.

• • • Providing a statistical mechanism for PRP, is the ALLOCATION CLASSIFICATION SYSTEM which directs the assignment of ACS code symbols to every purchase order with a view of trading direct as well as indirect material use.

• • • As an aid to the priority system, the quota assignment plan through production directives is designed to provide a balanced production of steel through centralized scheduling so that priority ratings will have an equal value for every production, and the most needed products can be rolled in the desired quantities.

• • • FOR THE FUTURE—If PRP fails, look for substitution of the warrant system, similar to that operating in England, where material checks are drawn for individual manufacturers on designated steel mills and only to the extent of the mill's capacity.

Foreign Solutions for Scrap Deficiency

(CONTINUED FROM PAGE 64)

acid or basic bessemer and the electric furnace processes. Here may also be mentioned a method not yet used in the U. S. which decarburizes the pig iron down to a low carbon content without melting.

The method originated in Sweden and is called the RK process. (This will be described later.)

Regarding the open hearth process, the decarburizing takes some time depending, of course, on the

degree of decarburizing to be accomplished. On order to speed up the decarburizing, there is added a certain amount of ore or other ferrous oxidizing agent. At the same time as the carbon in the pig iron is burnt off, the ore is reduced to iron which, of course, is an advantage; but, if the pig iron part in the charge is increased above a certain percentage, the entire process will be slowed down and the output decreased.

The electric furnace is less fit for the purpose of decarburizing, as the atmosphere in the electric furnace always is more reducing.

It may safely be assumed that the acid or basic Bessemer processes are the most rapid methods for converting iron into steel and involve comparatively small amounts of equipment.

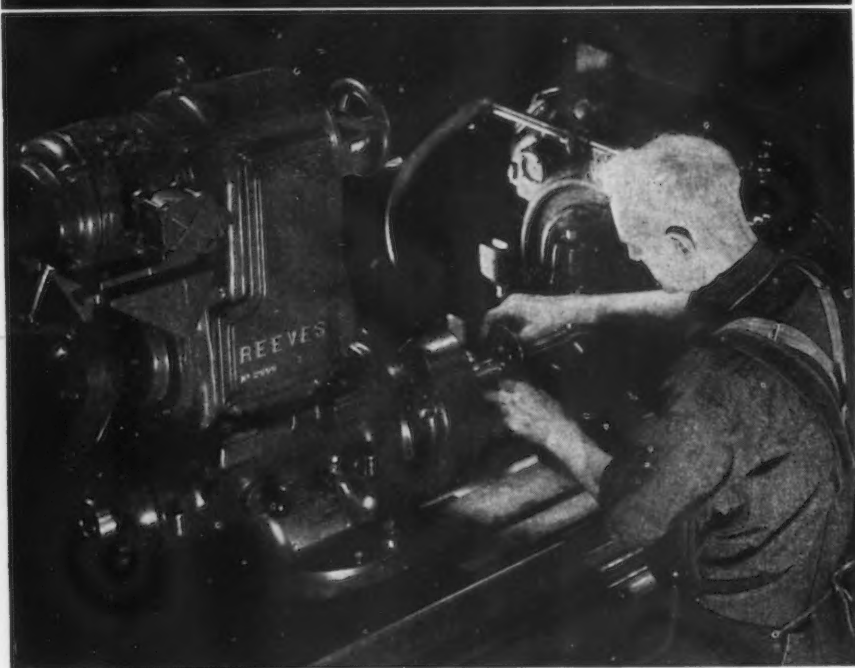
It is therefore not surprising that much thought has been given to more direct and simpler ways of recovering iron out of the ores, for example, by by-passing the pig iron process.

Sponge Iron Practice

Sponge iron, indeed, seems to be very simple to produce. It is obtained by treating the ore with a reducing agent in solid, liquid or gas form at a temperature below the melting point, and the iron is then obtained in a porous and loose structure. However, it has proved not to be so simple a production method. Even if the economical side of the problem is ignored under prevailing conditions, the technical side of the problem has many ramifications. There are, of course, plants working on a commercial scale, but only on a small scale and under especially favorable conditions.

It might be of interest to examine some examples from a part of the world where the most favorable conditions exist for processing and direct treating of the ore without smelting—the Scandinavian Peninsula. Sweden, for example, has always had a lack of high-grade scrap for her large steel industry. Therefore, it is quite natural that in this country money has been spent for over 100 years on experiments for directly reducing iron from the ores by by-passing the pig iron process; for, such a method not only would save charcoal, but also would eliminate the chance for the iron to pick up impurities from other charging

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materials. However, even if some gains have been made, the bulk of raw material for the Swedish steel industry is still pig iron.

Let it be said directly that the main obstacle to the success of the sponge iron processes is not so much chemical as mechanical in character. During the reduction of for example, hematite, the ore changes its chemical structure several times, i. e., $\text{Fe}_2\text{O}_3 \rightarrow \text{Fe}_3\text{O}_4 \rightarrow \text{FeO} \rightarrow \text{Fe}$. These changes are followed also by a change of the physical structure. This usually shows up in a crumbling of the ore which also is partly caused by precipitation of carbon in the developed porosities. In the range of reduction from FeO to Fe (1110 d deg. F. and up) occurs also a recrystallization which often causes the material to become adhesive. This will interfere with the mechanical operation. Blast furnace engineers know too well how careful they have to be with the materials and its charging in order not to run into trouble and disturbance in the smooth descending of the burden.

Högenas Process

The most advantageous method would, therefore, be one in which the reduction is accomplished without moving the material. Such a method has been in operation on a commercial scale for about 40 years in Sweden. The process is named for the inventor, Siurin, or has been called the Högenas process, as it is operating Högenas. In this process, clay crucibles are filled with layers of rich ore, coal and a little lime and heated for a couple of days in a kind of annular furnace. The spongy iron product is received as soft, spongy cake approximately 10 in. in diameter and 2 to 3 in. in thickness. It is almost entirely bought by steel plants for production of high-grade steel. Unfortunately, the process is too slow and expensive to be considered for large-scale operation.

One of the more successful methods for reduction by gas in continuous operation is the Wiberg method, and some plants are operating on a commercial scale with this furnace.

The reduction according to his method is accomplished in a shaft furnace charged with a rich ore or a sintered ore of a uniform size. The furnace can be considered as the upper part, above the hearth, of a blast furnace. The gases, are,

however, not passed through the shaft but partly drawn off at a height where the CO_2 content reaches about 30 per cent. These gases are sent through an electrically heated carburizing kiln where they are forced through a charge of heated coke, thus converting into almost pure CO gas. This gas enters the lower part of the reduction furnace at about 2190 deg. F. Thus a part of the gas is circulated

thereby transporting coke in gas form from the carburizing kiln to the reduction furnace. The abundant gases are inserted above the gas outlet and combusted in the upper part of the furnace for pre-heating and calcining of the ore.

The process has some disadvantages which will prevent its wider use. As said before, it is a part of the blast furnace with the same underlying troubles. In fact, it is



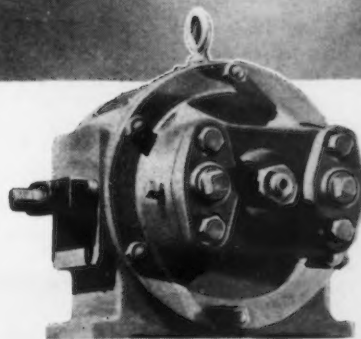
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..AND ON THE GROUND

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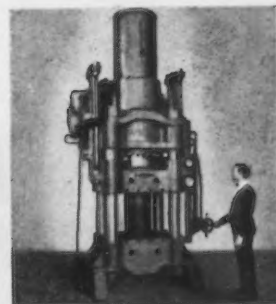


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THE Hele-Shaw Fluid Power Pump



Hele-Shaw Pump
with Type "FA"
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of many adjustable
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500 Ton Southwark Press, built by Baldwin-Southwark Division, Baldwin Locomotive Works, for mixing silver contacts to copper buss bars. Powered by a Hele-Shaw pump.

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considerably more dependent on the quality of ore, and as no coal particles keep the ore separated, the tendency of fritting or clinging is sharply increased. Also, the equipment is quite extensive for a large production.

Many methods have been tried by using the convenient rotary kiln for the reduction of iron ores (methods of Edvin in Norsk Stall and Professor Bo Kalling, etc.)

Kalling's process is interesting because he tried to use electricity for heating the charge. He charged a rotary kiln with a mixture of ore and carbon material and heated it between two disk-formed electrodes. After extensive experiments he had to abandon the method mainly because of the trouble caused from sticking.

Something in this connection should be said in regard to a combined method in which the ores are pre-reduced by means of the hot gases from a hearth where the material is melted to steel. Much thought has been given to this combination to find an intelligent solution of reduction and successful separation by smelting and also

avoiding heat losses. A furnace for this purpose was designed by two Swedish engineers, Flodin and Gustafsson. Much money has been spent on this method. A plant was erected and operated for some time in Norway, but at least the pre-reduction part of the furnace showed up with all the trouble already mentioned, and after years of struggle the plant was torn down.

Several methods have been tried by suspending the ore in fine form in a current of hot reducing gases. It is not known to the writer if any of these methods are commercially used, but it is very doubtful.

All these methods are only a small but representative part of all the methods tried in Scandinavia. Hundreds of patents have been taken out all over the world on more or less different methods for solving the problem of reducing the ore without smelting. So far the methods have not turned out to be dangerous competitors of the old methods of converting the ores. Generally, it can be said that the processes are too slow and require too much apparatus for a large-scale production. The ores will

have to be pre-treated carefully also for the purpose of avoiding too much gangue material, which would both increase the cost and decrease the production in the steel furnaces. Separation of the gangue material after the reduction usually has not been successful. However, as long as experienced men are still working on this fascinating problem, there is reason to hope that it will be solved some day. Prevailing conditions may even push a solution. First and mainly by decreasing the demand for purity of the product, the term "sponge iron" will have to be replaced by the term "smelting stock." The reduction will have to be performed within temperature ranges where no fritting occurs and the gases will have to be carefully controlled. It has to be made in continuous operation and in large units, the product being nodulized or briquetted hot and direct from the furnace. Recently issued patents show some hopeful thoughts along this line.

A favorable combination of the method of direct reduction and the electric pig iron process can be considered. The highly reductive gases from the blast furnace, containing about 70 per cent CO, could be utilized for reducing of the ore in the gas reduction furnace. Efforts are being made in this direction.

So far the smelting pig iron processes have kept their position. Combinations of this kind are usually more or less problematic. The heat and gases in this process are utilized favorably for pre-heating and reduction of the ores along the counter current principle. Moreover the reduced iron is separated from its gangue in the hearth, delivering the product to the steel furnace free from gangue materials. However, pig iron contains about 4 per cent carbon which must almost entirely be removed before it is converted to steel. This carbon is to be considered as a loss. About 90 lb. per ton of pig iron will have to be sacrificed for the greater simplicity and safety in processing iron out of the ores and receiving a product separated from its gangue material. Furthermore, the carbon in the pig iron helps also to convert it into steel; in the Bessemer and Thomas processes where the carbon is oxidized by blowing cold air through the liquid, it not only balances the heat, but it also



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manages to give the resulting steel the desired temperature.

In this connection the RK* process already mentioned will be discussed briefly. As Prof. Kalling abandoned his experiment of the reduction of iron from ore by bypassing the smelting in his rotary kiln, he turned to the opposite way, meaning that he made pig iron first and converted this into steel without melting. With another Swedish engineer, I. Rennerfelt, he developed the method now called the RK process of which already at least five furnaces of about 40 tons capacity are in continuous and successful operation in Sweden only. The method is based on the principle of malleable iron. The pig

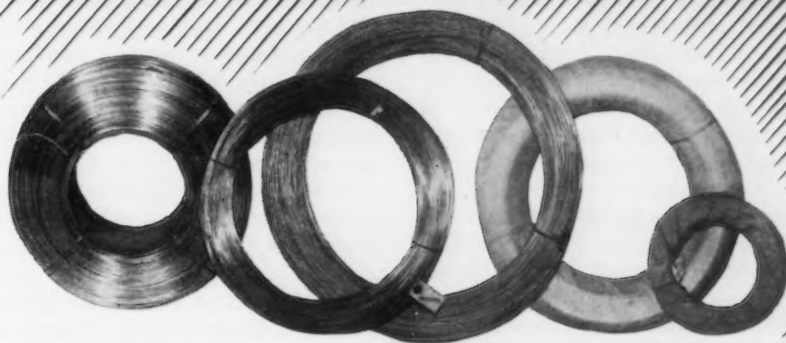
* See THE IRON AGE, Nov. 2, 1939, p. 40.

iron is granuled in water or by other methods and then decarburized by comparatively low temperature by an oxidizing gas mixture containing a certain amount of CO. The process is, of course, exothermic and additional heat is necessary only to counterbalance a part of the radiation loss. The method is continuous. Labor, installation and maintenance costs are very low. The product has exactly the shape of the pig iron granules with any desired carbon content down to 0.05 per cent. An advantage of the process is also that Cr, Mn, etc., contained in the pig iron will not be lost.

On this principle, in combination with the electric pig iron furnace of Det Norske Aktieselskab for Elektrokemisk Industri, several new plants have been built in recent years. The top gases from the pig iron furnace is used in the decarburizing process. Information has been received that the long planned plant in north Sweden will finally be erected on these lines.

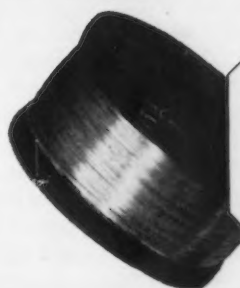
It may also be mentioned that a country of so small iron ore resources as Finland has for some years been operating a plant of this kind, where the electric pig iron furnaces are operated in line with RK and Bessemer decarburizing practice. The ore used is solely residue from pyritic ores which at first have given their sulphur to the numerous pulp plants in the country. This country has thus at least managed to make itself independent of steel imports for its railroad equipment.

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PERSONALS

• **F. W. Ochsenhirt, Jr.** has been appointed to the new position of general purchasing agent of Jones & Laughlin Steel Corp. and its subsidiaries. **W. A. Morris, Jr.**, assistant, has been advanced to purchasing agent, the post formerly held by Mr. Ochsenhirt.

• **George W. Sweeny** has been elected vice-president of finance and comptroller of H. C. Frick Coke and associated companies, U. S. Steel Corp. subsidiaries. Mr. Sweeny joined the H. C. Frick Coke Co. as a paymaster in the coke region in 1907. In 1927 he was appointed secretary and treasurer of the United States Fuel Co., which later became a part of United States Coal and Coke Co. In 1940 he was made auditor of the H. C. Frick Coke and associated companies.

• **Ralph B. Meisenhelder**, assistant to the president of the York Ice Machinery Corp., has been appointed director of war contract progress. **W. H. Long**, member of the sales promotion and advertising department of the company, has been commissioned an ensign in the Naval Reserve.

• **Ned H. Dearborn**, New York, has been made executive vice-president and managing director of the National Safety Council, Chicago. He succeeds **W. H. Cameron**, who is retiring after almost 30 years as managing director of the council. Since 1934, Mr. Dearborn has been dean of the division of general education of New York University, a post he now leaves.

• **A. E. Briscoe**, assistant manager of the order division, Pittsburgh district, Carnegie-Illinois Steel Corp., was awarded a 50-year Gary Service Medal Aug. 1. Mr. Briscoe, began his working career with the Falcon Iron and Nail Co., Niles, Ohio, as a clerk on Aug. 1, 1892. In 1900, when the company became a part of the American Sheet Steel Co., he was transferred to the New York general offices. In 1904, at the time of the consolidation of the American Sheet Steel Co. with the American Sheet and Tin Plate Co., he was transferred to Pittsburgh, and in 1937 when American Sheet and Tin Plate became a part of the

Carnegie-Illinois Steel Corp., he was made assistant manager of the order division, the position he now holds.

• **Elmer W. Silver**, secretary of Whitehead Metal Products Co., Inc., has been elected treasurer of the company, succeeding the late William L. Rianhard, who died July 24. Mr. Silver will continue as secretary, to which office he was elected last March. Previous to that time he had been assistant secretary for ten years.

• **Gurth F. Chambers**, general sales manager of Lever Bros. Co., Cambridge, Mass., has been made New England regional manager of the conservation division of WPB.

• **Edward V. Hickey**, former manager of the WPA Boston district office, has been made regional manager of a smaller war plant department. Before entering government service, Mr. Hickey was foreign sales manager of the Gillette Safety Razor Co.

• **Clair C. Johnston**, professor of civil engineering at the University of Detroit since 1927 and head of the Civil Engineering Department at the University since 1933, has become associated with the Murray Corp. of America, Detroit, as an industrial engineer.

• **Frank M. Stephens, Jr.**, has been named a research engineer on the technical staff of Battelle Memorial Institute, Columbus, Ohio, and has been assigned to the materials beneficiation division.

• **F. H. Lindus**, who has handled advertising assignments for The Timken Roller Bearing Co. in Canton, Ohio, for the past year, has returned to the sales department of the company's service division, at its San Francisco branch.

• **Gustave A. Peterson** has been elected vice-president of the Ferro Engineering Co., Cleveland. Following 17 years in the engineering department of Youngstown Sheet & Tube Co. he became chief engineer of the Ferro Engineering Co. in 1930. **Gordon F. Eaton**, associated with the company since 1934, has been appointed sales manager. **Levi J. Garms**, who has been with the company since 1930, has been appointed service manager, and **Philip R. Ward**, associated with



F. W. OCHSENHIRT, JR., general purchasing agent, Jones & Laughlin Steel Corp.

Ferro for the past 12 years, has been appointed office manager.

• **J. K. Beeson**, sales vice-president, Pittsburgh Steel Co., Pittsburgh, recently relinquished his civil duties to join the Army Air Corps with the commission of captain. Mr. Beeson has been with this company for the past 12 years in both operating and sales capacities. **Joseph A. Voeler**, formerly district sales manager for Pittsburgh Steel at New York, has been made general manager of sales and is located at Pittsburgh. **W. F. Boore** who has been with the company's New York office for several years has been made acting district sales manager for that office. **L. A. Ver Bryck** has been made Washington sales representative. **Joseph G. Smith** has been appointed acting district sales manager of the company's Pittsburgh district office and also continues his duties as compliance coordinator for the purchasing department. **A. S. Vandervoort, Jr.**, for many years district sales manager for Pittsburgh Steel at Houston, Tex., is now commissioned as a captain in the Army Air Corps. **Paul R. King**, who has been connected with the company's Houston office for several years has been made acting district sales manager for that office.

• **Robert S. Hart** has been appointed president, and **Hugh N.**

Baird, chairman of the board and chief executive officer of National Steel Car Corp. Ltd., Toronto, Messrs. Baird and Hart formerly were vice-presidents of the corporation and their appointments arose out of the vacancies created by the death of Robert J. Magor, president and chairman. **A. Van Hassel**, assistant secretary-treasurer, and **O. H. Anderson**, chief engineer, were appointed vice-presidents.

• **Paul W. Norris** who was formerly manager of purchasing and production planning of Denison Engineering Co., Columbus, Ohio, has been transferred to assume complete charge of sales, service and engineering as manager of marketing. **J. T. Hively** who was former head of the personnel and public relations department, has been transferred to manager of purchases. **George L. Avery**, office manager, has been named manager of priorities and production requirements, and **Walter H. Hackett** who was formerly assistant manager of personnel has been made manager of personnel and public relations.

• **Elmer W. Silver**, secretary, Whitehead Metal Products Co., Inc., has been elected treasurer of the company, succeeding the late William L. Rianhard, who died on July 24. Mr. Silver will continue as secretary, to which office he was elected last March. Previous to that time he had been assistant secretary for 10 years.

• **Edward F. Morgan** and **James A. Carter**, formerly with Henry Prentiss & Co., have joined the George Keller Machinery Co., Buffalo. Mr. Morgan will be associated with the Buffalo office. Mr. Carter will be the company's Rochester representative.

• **Samuel Danits**, of Donberg & Danits, Chicago, was elected president of the Machinery Dealers' National Association at the association's recent annual meeting held at the Merchants and Manufacturers Club, Chicago. Other officers elected at the meeting were: First vice-president, **Floyd L. Frye**, Frye Machinery Sales Co.; second vice-president, **George J. Feinberg**, Inland Machinery Co.; treasurer, **S. Barron**, Lake Machinery Co.

• **Alfred G. Gulliver**, manager of the Chevrolet Motor & Axle plant in Buffalo, has been appointed general manager of three Chevrolet factories in the Buffalo area. **Alton A. Way**, formerly assistant manager of the Tonawanda plant, has been named manager of that unit; **Lynn C. Fitzgerald**, formerly assistant manager of the Kenmore plant, was appointed manager of the plant; **Earl W. Pughe**, manager of the Delavan plant was moved up from assistant manager; **Major Craig Miller**, Army Air Force resident representative in the three plants, was promoted to the rank of lieutenant colonel.

• **F. W. Grant** has resigned as president of Atlas Plant Extensions Ltd., Welland, Ont. **John R. Read** has been named to succeed him as president of the crown company that was incorporated to administer the government's interest in the facilities created for the production of alloy steel at the plant of Atlas Steels Ltd.

• **Frank M. Boylan** has joined the Buda Company, Harvey, Ill., as a field representative in the Industrial Division handling railroad products and lifting jacks. Mr. Boylan before joining the Buda Company was on the sales force for 10 years of the Nester-Johnson Mfg. Co. of Chicago; two years with the Firestone Rubber Co., and eight years with the Ingersoll Watch Co.

• **William B. Belden**, member of the legal staff of Republic Steel Corp., has been named assistant counsel. Mr. Belden has been in the corporation's legal department since October, 1936, and previously was associated with the firm of Belden, Young, Veach.

• **R. S. Neblett**, assistant manager of the General Electric Co.'s turbine division, has been appointed to a position with the Bureau of Ships of the U. S. Navy. Mr. Neblett will be connected with the Bureau's office at Washington, and he will be engaged in work expediting the manufacture and delivery of geared-turbine propulsion sets for Navy ships. Mr. Neblett had been assistant manager of G-E's turbine division for the past three years, prior to which he had been manager of sales.

OBITUARY...

• **William L. Rianhard**, treasurer of Whitehead Metal Products Co., Inc., died suddenly, July 24, on a New York, New Haven & Hartford Railroad train. He would have been 82 years old on Aug. 15.

Mr. Rianhard began his career in the metal industry when he went to work as a clerk for Wallace & Sons, Ansonia, Conn., in 1881. Later he went with Randolph Clowes, of Waterbury. These firms subsequently became part of the American Brass Co. In 1898 Mr. Rianhard went to U. T. Hungerford Brass & Copper Company, serving until his retirement in 1916. In 1917 he joined Whitehead Metal Products Co. as assistant treasurer and director. He became treasurer of the company, now a subsidiary of the International Nickel Co. in 1924.

• **George Christopher Lloyd**, secretary of the Iron and Steel Institute, England, from 1909 to 1933, died July 10. He was 82 years old.

• **E. J. Hardtke**, designing engineer for the Seaman Body plant at Milwaukee for 25 years and for the past nine years a consulting engineer for the same firm, died July 26 at his home in Milwaukee after a short illness. He was 75 years old.

• **J. H. Connolly**, general manager and treasurer, Standard Machinery Co., Providence, died recently.

• **Francis C. Williams**, president of F. C. Williams, Inc., Dearborn, Mich., died July 18.

• **Frank S. Dunham**, of the Permutit Co., died in Chicago on July 23, aged 66 years.

• **Harry J. Leschen**, president of A. Leschen & Sons Rope Co., St. Louis, died suddenly of heart disease at his summer home at House Springs, Mo., following an illness of a year. He was 63 years old. He became associated with the company in 1897, and was made president in 1914.

Mr. Leschen was president of the National Wire Rope and Strand Manufacturers' Association between 1933 and 1941 and a director of the Mississippi Valley Trust Co.

NON-FERROUS METALS

... MARKET ACTIVITIES AND PRICE TRENDS

Lead Production High, Monthly Pool Revoked

... Lead production is running sufficiently ahead of demand, the WPB announced this week, to make unnecessary the 15 per cent monthly lead pool. The pool order has been revoked, but it may be restored at any time in the future, WPB pointed out, when need for it as an emergency supply arises.

Copper, on the other hand, has been placed under complete allocation, under an amendment to order M-9-a. Brass mill, wire mill and copper products, may be delivered only when the order bears the approximate allocation classification and purchaser's symbol, and bears a preference rating of A-1-k or higher.

Alumina production from low

grade domestic bauxite and clay was recommended to the WPB on Monday by the Advisory Committee on Metals and Minerals of the National Academy of Sciences. The committee has found that treatment of tailings by a recently developed sintering process will result in recovery of substantial amounts of alumina.

Plans for two new plants to raise zinc output were announced last week, one a pilot plant for development of untouched ore reserves, the other a recovery plant to get zinc from nickel silver scrap. The pilot plant and laboratory, to be established by the Bureau of Mines at a cost of \$350,000, will have an output of 500 lb. of metallic zinc daily. The gas reduction process to be used is based on experiments by the bu-

reau dating back over a decade. It involves roasting of the zinc concentrate to remove sulphur; heating, with methane burners, of retorts in which the ore has been placed and methane added; and condensation into metal of the resulting zinc vapor. The plant will probably be built in a south-central state.

In northern New York state, a recovery plant financed by the Metals Reserve Co., will recover copper and nickel, as well as zinc, from nickel silver scrap. According to the Bureau of Mines, domestic production of zinc has not kept pace with increasing demands. The zinc output during 1941 was 735,768 tons.

Foreign silver will be directed into war production and restricted for civilian use after Oct. 1, in a WPB order, issued July 29, naming insulated wire for electrical conductors, unnecessary electroplating, badges and insignia, silverware and silverclad metal among the items which can no longer use foreign silver.

Other developments in the non-ferrous field: Under the stimulus of MRC ore buying, vanadium production in Colorado and Utah is reaching peak outputs. When mills under construction in this area are completed, production will be raised another 50 per cent. . . . The Navy Department is expected to modify its solder specifications to reduce tin content and permit use of secondary materials. . . . Operations of the Tin Salvage Institute are reported at the rate of 12,000 lb. of metal sorted and treated a day. . . . "Hipersil," a steel developed by Westinghouse Electric & Mfg. Co., will be substituted for nickel alloy in electronic equipment, with an expected saving of 20,000 lb. of nickel this year. . . . Latin American orders for mercury, platinum, zinc, bauxite, beryl, beryllium and metallic cadmium will take preference, during the third quarter, over all other orders.

The monthly average prices of the major non-ferrous metals during July were, in reality, the OPA ceiling prices set on those metals.

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MACHINE TOOLS

... SALES, INQUIRIES AND MARKET NEWS

Builders Have Trouble Securing Raw Material

Cleveland

• • • Whether or not a real steel shortage exists, machine tool companies are having an increasingly difficult time in attempting to secure sufficient steel to permit sustained operations. Since the industry seldom had large orders of steel in the past, it finds itself in the predicament of currently being able to place mill size orders but with too low a rating to secure delivery from the mills. Thus, machine tool producers have largely been combing the warehouses and listings of distress stocks by companies which had overstocked for civilian production now halted. Appreciating the seriousness of the situation, producers have been taking substitute analyses of steel and odd sizes wherever possible.

In recent weeks, Ordnance department officials have actually taken idle machine tools out of plants which were not in position to use them. It is reported that such diversions have been made from the plants of Maytag Washing Machine, Spicer Mfg. Co., and Carnegie-Illinois Steel Co. Meanwhile, orders for new machine tools are still pouring in at a steady rate to permit the handling of new expansion and construction projects. The latest expansions in this area are reported to include: Euclid Road Machinery Co., the Schuster Tool & Die Co., Cleveland Chain & Mfg. Co., while the Motor Patterns Co. and Broden Construction Co. are building new warehouses. In addition, the Seyfang Mfg. Co. in Bradford, Pa., is making changes and additions to its plant. The expansions of National Carbon Co. and Electro-Metallurgical Corp. in various cities in Ohio are reported to be progressing favorably.

AA Ratings Given to 50% of Requirements

Cincinnati

• • • Material became a very important item to the district machine tool builders during the past week, as result of a new order

Steel Requirements Not Likely to Be Met

• • • It is reported that the machine tool industry has received its official steel allocations for the third quarter and that these will only be sufficient to meet a portion of the industry's requirements. The industry is greatly concerned over this development, which may reflect an enlarging of Washington's anti-expansion attitude to conserve materials as far as possible for plants now in operation.

from the WPB. Under the new order Washington assigned AA Priority Ratings to approximately 50 per cent of the material required by builders and leaves the old A-1-a priority on the remainder. Machine tool men generally have become quite concerned over the possibility of getting sufficient material to continue the present high rate of production on the basis of these new ratings, since on their face, it practically would require a cut of almost 50 per cent in output at a time when the large bulk of machine tools are on the critical materials list. Some hint, however, has been forthcoming from Washington, to the effect that by the time the additional

amount of material will be needed, unquestionably some plan will have been worked out whereby there will be no retardation in the output of tools. So far as new business is concerned, manufacturers indicate a steady flow of new orders, which, so far, have been sufficient to offset the cancellations on previous bookings.

Machine Tool Shipments Reach New High in June

Washington

• • • The value of new machine tools, presses and other metal working machinery shipped during June was \$122,700,000, according to the War Production Board. Shipments of machine tools alone amounted to 26,600 units, with a total value of \$111,147,000. During May, 25,700 units, valued at \$107,300,000 were shipped.

Production of metal working machinery has reached a rate of more than \$1,470,000,000 a year and is steadily on the increase. Last year the value of metal working machinery was about \$840,000,000 and the present going rate represents an increase of more than 75 per cent.

Compared with the same month of last year, the June value for all metal working machinery is an increase of 78 per cent.

FISHY NOSE: The forward gun ports and bombardier's window of this B-17-F bomber resemble an overgrown fish, but the Army says the Axis has found that these sky-fish are not "suckers."



SCRAP

... MARKET ACTIVITIES AND QUOTATION TRENDS

Small-Town Drives Going Strong; Some Cities Lag

••• According to reports from small towns the latter are gathering scrap at a better rate than the "big towns." Collections at the cross roads are mounting with interest running high.

Last week, WPB's conservation division outlined plans of government and industry to receive agricultural scrap through a "National Scrap Harvest." This program, already completed in Florida, Alabama, Arkansas and Oklahoma, aims at the collection of 2,500,000 tons of scrap from the country's 6,000,000 farms and is supervised by state and local salvage committees.

Eleven leading agricultural implement companies have joined with 25,000 dealers to help collect

the scrap from the country's farms and the large companies have instituted a publicity campaign of their own to further the effort.

The push is on to get scrap collected before winter sets in since many steel mills in the country face a difficult time ahead with stocks running low or actually "out."

Contrary to experience in the United States it is reported that Canadian firms have been able to build up stocks of scrap and in some cases piles will be sufficient to last until the first quarter of next year.

Some districts report that scrap allocations are on the increase with more in prospect. Meanwhile emphasis is being placed on local scrap drives which are lagging in some places.

Workmen Urged to Bring Metal Scrap to Their Plants

Cleveland

••• Pointing out that the nation needs a sound plan for bringing to steel mills the scrap lying in odd corners of the country, George T. Trundle, Jr., head of the Trundle Engineering Co., Cleveland, recently advocated that the way to solve the transportation and weighing of miscellaneous material is by inducing factory employees to bring their scrap in their cars to the place where they work.

"There it can be weighed, picked up by a crane and loaded into a freight car," said Mr. Trundle, whose ideas on scrap were printed in a booklet by his company.

In rural areas, collection depots should be established at flour and feed mills, coal, hay and grain yards and at freight stations, he added.

"City people can always manage to sell their scrap," he said. "The farmer, therefore, should be entitled to the same opportunity. Furthermore, if scrap is as necessary as is today announced in the war production program, it must have a real value; and that value should be recognized, as far as the farmer is concerned by paying him for the scrap he produces."

Mr. Trundle stated emphatically that "in order to be intelligently used in the war program, all scrap collected should feed into the established junk yards of the country."

J. & L. Is Cleared of Scrap Violation Charge

Pittsburgh

••• OPA's suit against Jones & Laughlin Steel Corp. alleging violation of scrap regulations was quashed in federal court here last week when Judge Schoonmaker dismissed the government charge. It was argued that the company had not paid higher than the ceiling price for scrap and hence was not guilty of any wrong doing.



Hack Sawing the MARVEL Way is Metal Cutting the Most Economical Way!

There is no cheaper method for cutting off identical pieces from bar steel than with a MARVEL Automatic Production Saw because it provides:

1. Greatest number of pieces, floor to floor, per cost-dollar.
2. Lowest equipment and tool cost.
3. Minimum labor cost. Requires no more attention than an automatic screw machine.
4. Lowest chip loss (more pieces per bar).

The MARVEL System of Metal Cutting provides exactly suited equipment for the requirements of every shop or plant, as well as the non-breakable (composite) MARVEL High-Speed-Edge Hack Saw Blades, which permit far greater speeds, feeds and blade tension. This complete line of advanced equipment is changing shop practice and production methods everywhere by making sawing more economical and more efficient than other methods.

Your local MARVEL Sawing Engineer will gladly analyze your metal cutting problems and point out where you can cut costs with the MARVEL System or we will gladly send bulletin on any of the following:

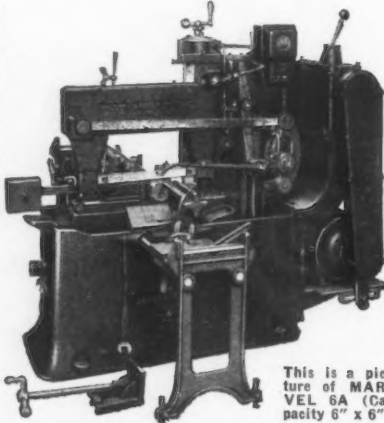
1. MARVEL No. 1, Dry Cutting General Purpose Saw (4" x 4" cap.)
2. MARVEL No. 2, General Purpose Hack Saw (6" x 8" cap.)
- 4B. MARVEL No. 4B, Light Duty, High Speed Saw (6" x 6" cap.)
6. MARVEL No. 6, Heavy Duty, High Speed Saw (6" x 6" cap.)

ARMSTRONG-BLUM MFG. CO.

"The Hack Saw People"

5700 Bloomingdale Ave., Chicago, U.S.A.
Eastern Sales: 225 Lafayette St., New York

- 6A. MARVEL No. 6A Automatic Production Saw with Automatic Bar Push-up (6" x 6" cap.)
8. MARVEL No. 8 Metal Cutting Band Saw (18" x 18" cap.)
9. MARVEL No. 9 Heavy Duty High Speed Saw (10" x 10" cap.)
- 9A. MARVEL No. 9A Automatic Production Saw with Heavy Duty Bar Push-up (10" x 10" cap.)
18. MARVEL No. 18 "Giant" Hydraulic Hack Saw (18" x 18" cap.)



This is a picture of MARVEL 6A (Capacity 6" x 6")

Third Scrap Yard Bought By American Rolling Mill Co Pittsburgh

• • • **American Rolling Mill Co.** has purchased the Butler Iron & Steel scrap yard at Butler, Pa., the third scrap yard that the steel company has purchased within the past month or so. The others are at Middletown, Ashland, and Butler. Since many scrap yards are having difficulty meeting wage requirements in view of OPA price ceilings, it is expected that other scrap yards will be sold to steel mills which can purchase unprepared scrap for \$17.50 a ton.

CINCINNATI—The national drive to bring out more scrap has had little or no effect in this district. Dealers generally report that the drive has not taken hold and that no noticeable change in the flow of old materials has yet taken place. Supplies continue to be equal to district consumption, with most mills operating comfortably, but inventories remain unchanged.

ST. LOUIS—Despite the slowing up of receipts of scrap iron, Granite City Steel Co. put on another furnace and other mills in the district are maintaining their high level of production, although to do so they are drawing heavily on their reserves. Mills report inventories of scrap cast overbalance steel, and are asking brokers to cease buying the former item, which dealers report is adversely affecting shipments here of steel by sellers of both.

PHILADELPHIA—Mill operators are still unable to understand the 1500 ton allocation of prepared and unprepared steel scrap from the yard of L. J. Geidicke. This allocation, the first in Philadelphia, went out of the district at 26c. extra per ton. Observers said the reason was scarcity of scrap and reduction of ore shipments, coupled with the reported shut down of a blast furnace at the steel plant getting the scrap.

PITTSBURGH—The number of dislocated area allocations made by the WPB has increased in recent weeks. Tonnages of scrap in Alabama were allocated to Erie, Pa. consumers, while some Texas scrap was allocated to a Warren mill. Meanwhile, a decision is still awaited on pit or salamander scrap, and tube-ends, two situations which have been confused for some three or four weeks now. Tonnages of pit scrap are being held up because of this, while tube-ends are going into the open hearth instead of to electric furnaces and to foundries.

TORONTO—Scrap offerings in Canada for the past couple of months have been running well in excess of consumption but local dealers say there has been speeding up in imports from the United States re-

cently and thousands of tons of scrap have been moving across the lakes and by rail to Ontario steel plants. It is reported that Canada has been shipping scrap to the United States recently. At present most steel mills and electric furnaces in Ontario have built very extensive reserve stock piles of steel scrap, estimated to be sufficient to carry them almost to the end of first quarter next year and continue to take all offerings by dealers and brokers.

BOSTON—Unsatisfactory prices, stringent classifications and lack of labor continue to retard movement of materials. The number of yards closing for the duration is slowly increasing. Movement of automobile scrap shows a noticeable slump as is attested by at least one government inspector, who admits New England prices are out of line with those elsewhere and that some adjustment will probably have to be made before the situation clears.

BIRMINGHAM—Scrap dealers report continued scarcity in virtually all wanted items while the insistency of demand continued unabated. Yards are see-sawing back and forth with some accumulation today and practically nothing tomorrow.

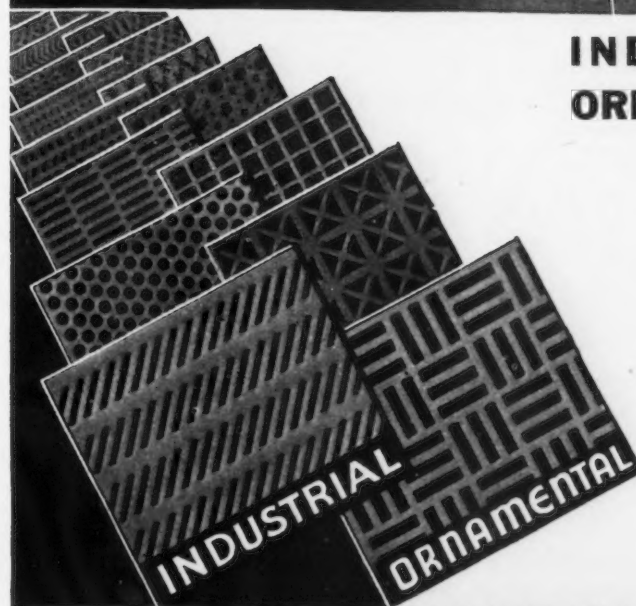
DETROIT—Automobile graveyards in Michigan in June moved 19,865 tons of scrap to steel mills and foundries, according to the local WPB office. About 30,000 junked cars were moved from 600 scrap yards in June, it was reported.

CLEVELAND—Allocations of scrap shipments to the most needy mills and foundries have been increasing in recent weeks. Practically all railroad scrap, most of the industrial scrap, and growing amounts of dealer scrap is moving on allocations. Many such allocations are made to dealers in better situated areas for shipment to users in sections where no excess steel scrap is available. It is understood that various local ordinances throughout the country restricting movements of "junkies" will be withdrawn for the duration of the war.

BUFFALO—Thirty-five representatives of the WPB Conservation Division, here last weekend to spur an intensive campaign to keep scrap moving to the steel plants, noted that most dealers' yards are being worked at capacity. Republic Steel, here, has been exceptionally fortunate in accumulating approximately 40,000 tons reserve for next winter. Bethlehem's Lackawanna plant, with three times as many open hearths, still has only about 42,000 tons in store and is expected to run into difficulties before next spring.

CHICAGO—The scrap supply situation here shows no improvement, with mills still operating on a hand to mouth basis. No headway is being made toward building stocks for the winter and little hope is held that such stocks can be accumulated. The slackening in operations here in recent weeks is attributed solely to repairs; no furnaces are reported down due to lack of scrap.

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New York Office, 114 Liberty Street**

SCRAP PRICES

IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

ELECTRIC FURNACE, ACID OPEN HEARTH AND FOUNDRY GRADES

(All Prices Are Per Gross Ton)

	BASIC OPEN HEARTH GRADES (No. 1 Heavy Melting; No. 1 Hydr. Com- pressed Black Sheets; No. 2 Heavy Melting; Dealers' No. 1 Bundles; Dealers' No. 2 Bundles; No. 1 Busheling)			BLAST FURNACE GRADES (Mixed Borings and Turnings; Shovelling Turnings; No. 2 Busheling; Cast Iron Borings)			Low Phos.			Heavy Structural and Plate			Cut Auto. Steel Scrap			1 ft. and Under Auto. Springs, and Crank- shafts	Alloy free Low Phos. and Sulphur Turnings	Heavy Axle and Forge Turn. First Cut	Electric Furnace Bundles
	Machine Shop Turnings	Turnings	Turnings	Bar Crops, Punch- ings, Plate Scrap and Cast Steel Scrap	3 ft. and Under	2 ft. and Under	1 ft. and Under	3 ft. and Under	2 ft. and Under	1 ft. and Under	3 ft. and Under	2 ft. and Under	1 ft. and Under	3 ft. and Under	2 ft. and Under				
Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton.....	\$20.00	\$16.00	\$16.00	\$25.00	\$22.50	\$23.00		\$21.00	\$21.50	\$22.00	\$20.00	\$20.50	\$21.00	\$18.00	\$19.50	\$21.00			
Cleveland, Middletown, Cincinnati, Portsmouth.....	19.50	15.50	15.50	24.50	22.00	22.50		20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50			
Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville, Sparrows Pt....	18.75	14.75	14.75	23.75	21.25	21.75		19.75	20.25	20.75	18.75	19.25	19.75	16.75	18.25	19.75			
Ashland, Ky.....	19.50	15.50	15.50	24.50	22.00	22.50		20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50			
Buffalo, N. Y.....	19.25	15.25	15.25	24.25	21.75	22.25		20.25	20.75	21.25	19.25	19.75	20.25	17.25	18.75	20.25			
Bethlehem, Pa.; Kokomo, Ind.....	18.25	14.25	14.25	23.25	20.75	21.25		19.25	19.75	20.25	18.25	18.75	19.25	16.25	17.75	19.25			
Duluth, Minn.....	18.00	14.00	14.00	23.00	20.50	21.00		19.00	19.50	20.00	18.00	18.50	19.00	16.00	17.50	19.00			
Detroit, Mich.....	17.85	13.85	13.85	22.85	20.35	20.85		18.85	19.35	19.85	17.85	18.35	18.85	15.85	17.35	18.85			
Toledo, Ohio.....		13.85	13.85	22.85	20.35	20.85		18.85	19.35	19.85	17.85	18.35	18.85	15.85	17.35	18.85			
St. Louis, Mo.....	17.50	13.50	13.50	22.50	20.00	20.50		18.50	19.00	19.50	17.50	18.00	18.50	15.50	17.00	18.50			
Atlanta, Ga.; Alabama City, Ala.; Birmingham, Los Angeles; Pittsburg, Cal.; San Francisco	17.00	13.00	13.00	22.00	19.50	20.00		18.00	18.50	19.00	17.00	17.50	18.00	15.00	16.50	18.00			
Minneapolis, Colo.....	16.50	12.50	12.50	21.50	19.00	19.50		17.50	18.00	18.50	16.50	17.00	17.50	14.50	16.00	17.50			
Seattle, Wash.....	14.50	10.50	10.50	19.50	17.00	17.50		15.50	16.00	16.50	14.50	15.00	15.50	12.50	14.00	15.50			

BUNDLES: Tin can bundles are \$4 below dealers' No. 2 bundles; No. 3 bundles are \$2 less than No. 1 heavy melting.

SWITCHING CHARGES: Deductions for shipping points within basing points (cents per gross ton) are: Pittsburgh, Brackenridge, 55c.; Midland, Johnstown, Sharon, Youngstown, Warren, Weirton, Cleveland, Toledo, Los Angeles, San Francisco, 42c.; Butler, Monessen, Canton, Steubenville, Cincinnati*, Portsmouth, Ashland, Coatesville, Harrisburg, Phoenixville, Bethlehem, Kokomo, Duluth, St. Louis, 28c.; Buffalo, Claymont, Conshohocken, 36c.; Atlanta, Birmingham, Pittsburg, Cal., 32c.; Middletown, 14c.; Sparrow's Point, 11c.; Chicago, 84c.; Detroit, 53c.; Alabama City, 26c.; Minnequa, 22c.; Seattle, 38c. *At Cincinnati, for basic open hearth grades, cut auto scrap and auto springs and crankshafts, deduct 80c. per ton.

PITTSBURGH basing point includes switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport. Cincinnati basing point includes Newport, Ky., switching district. St. Louis includes switching districts of Granite City, East St. Louis, Madison, Ill. San Francisco includes switching districts of S. San Francisco, Niles and Oakland, Cal.

MAXIMUM prices of inferior grades shall continue to bear same differential below corresponding grades as existed during the period Sept. 1, 1940, to Jan. 31, 1941. Superior grades cannot be sold at a premium without approval of OPA. Special preparation charges in excess of the above prices are banned. Whenever any electric furnace or foundry grades are purchased for open hearth or blast furnace use, prices may not exceed the prices above for the corresponding open hearth grades.

MAXIMUM SHIPPING POINT PRICE—Where shipment is by rail or vessel, or by combination of rail and vessel, the scrap is at its shipping point when placed f.o.b. railroad car or f.a.s. vessel. In such cases, the maximum shipping point prices shall be: (a) For shipping points located within a basing point, the price listed in the table above for the scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point and (b) for shipping points located outside the basing point, the price in table above at the most favorable basing point minus the lowest transportation charge by rail or water or combination thereof. Dock charge is 75c. a ton*, but 50c. if moved by deck scow or railroad lighter. Shipping by motor vehicle: The scrap is at its shipping point when loaded. For shipping points located within basing points take price listed in table minus applicable switching charge. If located outside a basing point, the price at the most favorable basing point minus lowest established charge for transporting by common carrier. If no established trans-

portation rate exists, the customary costs are deducted. Published dock charges prevail. If unpublished include 75c.* For exceptions see official order.

AT NEW YORK city or Brooklyn, the maximum shipping point price is \$15.33 for No. 1 heavy melting, f.o.b. cars, f.a.s. vessel or loaded on truck. Other grades carry differentials similar to those in table. New Jersey prices must be computed on basis of all-rail. At Boston the maximum is \$15.05 for No. 1 f.o.b. cars, f.a.s. vessel or loaded on trucks. Shipments from a New England shipping point to a consumer outside New England carry maximum transportation charge of \$6.65 per ton.

UNPREPARED SCRAP: For unprepared scrap, maximum prices shall be \$2.50 less than the maximum prices for the corresponding grade or grades of prepared scrap. In no case, however, shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Converter may charge \$2.50 per ton on consumer-owned unprepared remote scrap (see order).

Maximum price of all scrap in a vehicle is that of the lowest price grade in the shipment. This limitation does not apply to vessel shipments if grades are segregated.

Where scrap is to undergo preparation prior to its arrival at the point of delivery, such scrap is not at its shipping point, as that phrase is defined above, until after preparation has been completed.

CHEMICAL BORINGS: No. 1 (new, clean, containing not more than 1 per cent oil), \$1 less than No. 1 heavy melting; No. 2 (new, clean, containing not more than 1.5 per cent oil), \$2 less than No. 1 heavy melting. If loaded in box cars add 75c.

UNPREPARED CAST IRON SCRAP—Except for heavy breakable cast, unprepared scrap is given a price ceiling of \$2.50 per ton less than the maximum prices for the corresponding grade of prepared cast iron scrap. Where scrap is to undergo preparation prior to arrival at the point of delivery, such scrap is not considered at shipping point until preparation is completed.

Consumers of cast scrap may pay the shipping point price plus established charge for transporting the scrap to their plants. In the case of deliveries by truck, the cast scrap buyer must obtain from the seller a certification, made out to OPA.

*At Memphis 50c.; Great Lakes ports \$1; New England \$1.25.

RAILROAD SCRAP

	No. 1 RR Heavy Melting	Scrap Rails	Rails for Re-rolling	Scrap Rails		
				3 ft. and Under	2 ft. and Under	18 in. and Under
Cleveland, Cincinnati, Ashland, Portsmouth, Middletown.....	\$20.50	\$21.50	\$22.00	\$23.50	\$23.75	\$24.00
Canton, Pittsburgh, Sharon, Steubenville, Wheeling, Youngstown.....	21.00	22.00	23.50	24.00	24.25	24.50
Chicago, Philadelphia, Sparrows Pt., Wilmington, Birmingham, Los Angeles, San Francisco.....	19.75	20.75	22.25	22.75	23.00	23.25
Buffalo.....	20.25	21.25	22.75	23.25	23.50	23.75
Detroit.....	18.85	19.85	21.35	21.85	22.10	22.35
Duluth.....	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.....	17.00	18.00	19.50	20.00	20.25	20.50
Kokomo, Ind.....	19.25	20.25	21.75	22.25	22.50	22.75
Seattle.....	15.50	16.50	18.00	18.50	18.75	19.00
St. Louis.....	18.50	19.50	21.00	21.50	21.75	22.00

CAST IRON SCRAP

	Group A	Group B	Group C
No. 1 cupola cast.....	\$18.00	\$19.00	\$20.00
No. 1 machinery cast, drop broken, 150 lbs. and under.....	18.00	19.00	20.00
Clean auto cast.....	18.00	19.00	20.00
Unstripped motor blocks.....	17.50	18.50	19.50
Stove Plate.....	17.00	18.00	19.00
Heavy Breakable Cast.....	15.50	16.50	17.50
Charging box size cast.....	17.00	18.00	19.00
Misc. Malleable.....	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C: States not named in A and B; switch district of Kansas City, Kan., Mo.

Comparison of Prices . . .

Advances Over Past Week in Heavy Type; Declines in *Italics*. (Prices Are F.O.B. Major Basing Points)

Flat Rolled Steel:	Aug. 4,	July 28,	July 7,	Aug. 5,
(Cents Per Lb.)	1942	1942	1942	1941
Hot rolled sheets.....	2.10	2.10	2.10	2.10
Cold rolled sheets.....	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip.....	2.10	2.10	2.10	2.10
Cold rolled strip.....	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00

Tin and Terne Plate:	Aug. 4,	July 28,	July 7,	Aug. 5,
(Dollars Per Base Box)	1942	1942	1942	1941
Tin plate	\$5.00	\$5.00	\$5.00	\$5.00
Manufacturing ternes ..	4.30	4.30	4.30	4.30

Bars and Shapes:	Aug. 4,	July 28,	July 7,	Aug. 5,
(Cents Per Lb.)	1942	1942	1942	1941
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars.....	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302).	24.00	24.00	24.00	24.00

Wire and Wire Products:	Aug. 4,	July 28,	July 7,	Aug. 5,
(Cents Per Lb.)	1942	1942	1942	1941
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55

Rails:	Aug. 4,	July 28,	July 7,	Aug. 5,
(Dollars Per Gross Ton)	1942	1942	1942	1941
Heavy rails	\$40.00	\$40.00	\$40.00	\$40.00
Light rails	40.00	40.00	40.00	40.00

Semi-Finished Steel:	Aug. 4,	July 28,	July 7,	Aug. 5,
(Dollars Per Gross Ton)	1942	1942	1942	1941
Rerolling billets	\$34.00	\$34.00	\$34.00	\$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00

Wire Rods and Skelp:	Aug. 4,	July 28,	July 7,	Aug. 5,
(Cents Per Lb.)	1942	1942	1942	1941
Wire rods	2.00	2.00	2.00	2.00
Skelp (grvd)	1.90	1.90	1.90	1.90

Pig Iron:	Aug. 4,	July 28,	July 7,	Aug. 5,
(Per Gross Ton)	1942	1942	1942	1941
No. 2 fdy., Philadelphia...	\$25.89	\$25.89	\$25.89	\$25.84
No. 2, Valley furnace....	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti...	24.68	24.68	24.68	24.06
No. 2, Birmingham.....	20.38	20.38	20.38	20.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa...	25.39	25.39	25.39	25.34
Basic, Valley furnace...	23.50	23.50	23.50	23.50
Malleable, Chicago†	24.00	24.00	24.00	24.00
Malleable, Valley	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago...	31.34	31.34	31.34	31.34
Ferromanganese†	135.00	135.00	135.00	120.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
‡For carlots at seaboard.

Scrap:	Aug. 4,	July 28,	July 7,	Aug. 5,
(Per Gross Ton)	1942	1942	1942	1941
Heavy melt'g steel, P'gh...	\$20.00	\$20.00	\$20.00	\$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	17.85
Low phos. plate, Youngs'n	22.50	22.50	22.50	23.00
No. 1 cast, Pittsburgh...	20.00	20.00	20.00	22.00
No. 1 cast, Philadelphia...	20.00	20.00	20.00	24.00
No. 1 cast, Ch'go.....	20.00	20.00	20.00	20.00

Coke, Connellsville:	Aug. 4,	July 28,	July 7,	Aug. 5,
(Per Net Ton at Oven)	1942	1942	1942	1941
Furnace coke, prompt...	\$6.00	\$6.00	\$6.00	\$6.125
Foundry coke, prompt...	6.875	6.875	6.875	6.875

Non-Ferrous Metals:	Aug. 4,	July 28,	July 7,	Aug. 5,
(Cents per Lb. to Large Buyers)	1942	1942	1942	1941
Copper, electro., Conn...	12.00	12.00	12.00	12.00
Copper, Lake, New York.	12.00	12.00	12.00	12.00
Tin (Straits), New York.	52.00	52.00	52.00	51.75
Zinc, East St. Louis....	8.25	8.25	8.25	7.25
Lead, St. Louis.....	6.35	6.35	6.35	5.70
Antimony (Asiatic), N.Y.	16.50	16.50	16.50	16.50

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 140 to 148 herein.

Composite Prices . . .

FINISHED STEEL		PIG IRON		SCRAP STEEL	
Aug. 4, 1942.....	2.30467c. a Lb.....	.....	\$23.61 a Gross Ton.....	.....	\$19.17 a Gross Ton.....
One week ago.....	2.30467c. a Lb.....	.....	\$23.61 a Gross Ton.....	.....	\$19.17 a Gross Ton.....
One month ago.....	2.30467c. a Lb.....	.....	\$23.61 a Gross Ton.....	.....	\$19.17 a Gross Ton.....
One year ago.....	2.30467c. a Lb.....	.....	\$23.61 a Gross Ton.....	.....	\$19.17 a Gross Ton.....

HIGH		LOW		HIGH		LOW		HIGH		LOW	
1942.....	2.30467c.,	2.30467c.,		\$23.61	\$23.61	\$19.17	\$19.17				
1941.....	2.30467c.,	2.30467c.,		\$23.61, Mar. 20	\$23.45, Jan. 2	\$22.00, Jan. 7	\$19.17, Apr. 10				
1940.....	2.30467c., Jan. 2	2.24107c., Apr. 16		23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9				
1939.....	2.35367c., Jan. 3	2.26689c., May 16		22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16				
1938.....	2.58414c., Jan. 4	2.27207c., Oct. 18		23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7				
1937.....	2.58414c., Mar. 9	2.32263c., Jan. 4		23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10				
1936.....	2.32263c., Dec. 28	2.05200c., Mar. 10		19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9				
1935.....	2.07642c., Oct. 1	2.06492c., Jan. 8		18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29				
1934.....	2.15367c., Apr. 24	1.95757c., Jan. 2		17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25				
1933.....	1.95578c., Oct. 3	1.75836c., May 2		16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3				
1932.....	1.89196c., July 5	1.83901c., Mar. 1		14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5				
1931.....	1.99629c., Jan. 13	1.86586c., Dec. 29		15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29				
1930.....	2.25488c., Jan. 7	1.97319c., Dec. 9		18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9				
1929.....	2.31773c., May 28	2.26498c., Oct. 29		18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3				

Weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Prices of Finished Iron and Steel . . .

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point ↓ Product											10 Pacific Ports, Cars	DELIVERED TO		
	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	Detroit	New York	Phila- delphia
SHEETS														
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢	2.65¢	2.22¢	2.35¢	2.28¢
Cold rolled ¹	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢	3.70¢	3.17¢	3.41¢	3.39¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢	4.05¢		3.75¢	3.65¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢	4.00¢	3.47¢	3.73¢	3.69¢
Long ternes ²	3.80¢		3.80¢								4.55¢		4.18¢	4.14¢
STRIP														
Hot rolled ³	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢	2.75¢	2.22¢	2.48¢	
Cold rolled ⁴	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester = 3.00¢)				2.92¢	3.18¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢						2.58¢	
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester = 3.35¢)				3.07¢	3.33¢	
TIN PLATE														
Standard cokes, base box	\$5.00	\$5.00	\$5.00						\$5.10				5.38¢	5.34¢
BLACK PLATE														
29 gage ⁵	3.05¢	3.05¢	3.05¢						3.15¢		13 4.05¢			3.39¢
TERNES, M'FG.														
Special coated, base box	\$4.30	\$4.30	\$4.30						\$4.40					
BARS														
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth = 2.25¢)		2.52¢	2.80¢	2.27¢	2.51¢	2.49¢
Rail steel ⁶	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.52¢	2.80¢			
Reinforcing (billet) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		2.52¢	2.55¢	2.27¢	2.40¢	
Reinforcing (rail) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.52¢	2.55¢	2.27¢		2.49¢
Cold finished ⁸	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢		(Detroit = 2.70¢)					3.01¢	2.99¢
Alloy, hot rolled	2.70¢	2.70¢				2.70¢		(Bethlehem, Massillon, Canton = 2.70¢)				2.82¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢						3.47¢		
PLATES														
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.25¢ ⁽¹¹⁾	2.47¢	2.65¢	2.33¢	2.30¢	2.155¢
Wrought iron	3.80¢													
Floor plates	3.35¢	3.35¢								3.72¢	4.00¢		3.73¢	3.69¢
Alloy	3.50¢	3.50¢			(Coatesville = 3.50¢)					3.97¢	4.15¢		3.71¢	3.60¢
SHAPES														
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem = 2.10¢)		2.47¢	2.75¢		2.28¢	2.22¢
SPRING STEEL, C-R														
0.26 to 0.50 Carbon	2.80¢			2.80¢				(Worcester = 3.00¢)						
0.51 to 0.75 Carbon	4.30¢			4.30¢				(Worcester = 4.50¢)						
0.76 to 1.00 Carbon	6.15¢			6.15¢				(Worcester = 6.35¢)						
1.01 to 1.25 Carbon	8.35¢			8.35¢				(Worcester = 8.55¢)						
WIRE⁹														
Bright ¹⁰	2.60¢	2.60¢		2.60¢	2.60¢			(Worcester = 2.70¢)			3.10¢			2.94¢
Galvanized	add proper size extra and galvanized extra to bright wire base, above.													
Spring (High Carbon)	3.20¢	3.20¢		3.20¢				(Worcester = 3.30¢)			3.70¢			3.54¢
PILING														
Steel sheet	2.40¢	2.40¢				2.40¢					2.95¢			2.74¢
IRON BARS¹²														
Wrought single refined	4.40¢													
Wrought double refined	5.40¢													

¹ Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. ² Unassorted 8-lb. coating. ³ Widths up to 12 in. ⁴ Carbon 0.25 per cent and less. ⁵ Applies to certain width and length limitations. ⁶ For merchant trade. ⁷ Prices for straight length material only, from a producer to a consumer. Functional discount of 25c. per 100 lb. to fabricators. ⁸ Also shafting. For quantities of 20,000 to 39,999 lb. ⁹ Carload lot to manufacturing trade. ¹⁰ These prices do not apply if the customary means of transportation (rail and water) are not used. ¹¹ Ship plates only. ¹² Common iron bars quoted at 2.15c. by Terre Haute, Ind. producer. ¹³ Boxed. ¹⁴ Portland and Seattle price, San Francisco price is 2.50c. ¹⁵ This bright wire base price to be used in figuring annealed and bright finish wires, commercial spring wire and galvanized wire.



IMMORTAL STEEL!

Steel never dies!

That chugging old "runabout" you prized in 1913 may have been the great-granddaddy of this leaping, roaring, death-spitting Army Jeep! For some of the scrap steel from that old favorite may actually have found its way into the blitz buggies of our mobile Army.

Thus is the immortality of steel demonstrated.

For steel not only perpetuates itself but also is improved in the process, by combining in proper degree old, worn out, discarded products of steel with smelted iron ore to produce more and better steel for the formidable weapons of the nation's defenders. Each ton of iron and steel scrap so "mixed" results in approximately TWO tons of vital new steel... for war now...

for as yet undreamed of uses and conveniences later.

So Steel lives on! With each re-use it multiplies itself... is made into more and better products... serves another steel lifetime of usefulness... returns to scrap, to repeat a cycle of ever growing volume and indestructibility.

Scrap, desperately needed now to produce more steel for war, will one day make your life and your America more happy and abundant. For now... for then... *get in the scrap!*



Pittsburgh Steel Co.

GRANT BUILDING PITTSBURGH, PA.

PRICES

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are \$2.25 higher; f.o.b. Duluth, billets only, \$2 higher.

	Per Gross Ton
Rerolling	\$34.00
Forging quality	40.00

Shell Steel

	Per Gross Ton
3 in. to 12 in.	\$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00
Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.	
Prices delivered Detroit are \$2.25 higher.	

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	\$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.30c.

Wire Rods

(No. 5 to 9/32 in.)

	Per Lb.
Pittsburgh, Chicago, Cleveland	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

Alloy Steel Blooms, Billets and Slabs

Pittsburgh, Chicago, Canton, Massillon, Buffalo, or Bethlehem, per gross ton \$54.00

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)

	Base per Lb.
High speed	67c.
Straight molybdenum	54c.
Tungsten-molybdenum	57½c.
High-carbon-chromium	43c.
Oil hardening	24c.
Special carbon	22c.
Extra carbon	18c.
Regular carbon	14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi, 3c. higher.

CORROSION AND HEAT-RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.90c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F.Billets	15.725c.	16.15c.	19.125c.	23.375c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hotstrip	17.00c.	17.50c.	24.00c.	35.00c.
Cold st.	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices (in italics) are delivered quotations per gross ton computed on the basis of the official maxima.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorus	Charcoal
Boston††	\$25.53	\$25.03	\$26.53	\$26.03		
Brooklyn	27.65			28.15		
Jersey City	26.62	26.12	27.62	27.12		
Philadelphia	25.89	25.39	26.89	26.39		
Bethlehem, Pa.	\$25.00	\$24.50	\$26.00	\$25.50		
Everett, Mass.††	25.00	24.50	26.00	25.50		
Swedeland, Pa.		24.50			\$29.50	
Steelton, Pa.	25.00	24.50	26.00	25.50	29.50	
Birdsboro, Pa.	25.00	24.50				
Sparrows Point, Md.	24.00	23.50	25.00	24.50		
Erie, Pa.	24.00	23.50	24.50	24.00		
Neville Island, Pa.	24.00	23.50	24.50	24.00		
Sharpville, Pa.*	24.00	23.00	25.00	24.50	29.50	
Buffalo	24.68	24.68		25.18		
Cincinnati	25.47	24.97	25.97	25.47		
Canton, Ohio	26.06	25.56	26.56	26.06		
Mansfield, Ohio	24.50	24.00				
St. Louis	24.00	23.50	24.50	24.00		\$37.34
Chicago	24.00	23.50	24.50	24.00		
Granite City, Ill.	24.00	23.50	24.50	24.00		
Cleveland	24.00	23.50		24.00		
Hamilton, Ohio	24.00	23.50	24.50	24.00		
Toledo	24.00	23.50	24.50	24.00		
Youngstown*	24.00	23.50	24.50	24.00		
Detroit						\$28.00
Lake Superior Fe						33.00
Lyles, Tenn. Fe.†	26.76		27.26	26.76		
St. Paul	24.50		25.00	24.50		
Duluth	20.38	19.00	25.00			
Birmingham	27.25					
Los Angeles	27.25					
San Francisco	27.25					
Seattle	22.00					
Provo, Utah	27.50	27.50		28.00		
Moritz	25.50	25.50		26.00		
Toronto						

GRAY FORGE IRON: Valley or Pittsburgh furnace \$23.50

*Pittsburgh Coke & Iron Co. (Sharpville, Pa. furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

†Price shown is for low-phosphorous iron; high-phosphorous sells for \$28.50 at the furnace.

††Eastern Gas & Fuel Associates, Boston, is permitted to sell pig iron produced by its selling company, Mystic Iron Works, Everett, Mass., at \$1 per gross ton above maximum prices.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade (1.75 per cent to 2.25 per cent).

Phosphorous Differentials: Basing point prices are subject to a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over.

Manganese Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.50 per cent manganese content in excess of 1.00 per cent.

NATIONAL EMERGENCY STEELS (Hot Rolled)

Extras for Alloy Content

Designation	CHEMICAL COMPOSITION LIMITS, PER CENT									Basic Open-Hearth		Electric Furnace	
	Carbon	Manganese	Phosphorus Max.	Sulphur Max.	Silicon	Nickel	Chromium	Molybdenum	Vanadium	Bars & Bar-Strip	Billets, Blooms, & Slabs	Bars & Bar-Strip	Billets, Blooms, & Slabs
NE 8024	.22/.28	1.00/1.30	.040	.040	.20/.35			.10/.20		.45c	\$ 9.00	.95c	\$19.00
NE 8124	.22/.28	1.30/1.60	.040	.040	.20/.35			.25/.35		.85	17.00	1.35	27.00
NE 8233	.30/.36	1.30/1.60	.040	.040	.20/.35			.10/.20		.65	13.00	1.15	23.00
NE 8245	.42/.49	1.30/1.60	.040	.040	.20/.35			.10/.20		.65	13.00	1.15	23.00
NE 8339	.35/.42	1.30/1.60	.040	.040	.20/.35			.20/.30		.75	15.00	1.25	25.00
NE 8442	.38/.45	1.30/1.60	.040	.040	.20/.35			.30/.40		.90	18.00	1.40	28.00
NE 8447	.43/.50	1.30/1.60	.040	.040	.20/.35			.30/.40		.90	18.00	1.40	28.00
NE 8547	.43/.50	1.30/1.60	.040	.040	.20/.35			.40/.60		1.25	25.00	1.75	35.00
NE 8620	.18/.23	.70/.95	.040	.040	.20/.35	.40/.60	.40/.60	.15/.25		.75	15.00	1.25	25.00
NE 8630	.27/.33	.70/.95	.040	.040	.20/.35	.40/.60	.40/.60	.15/.25		.75	15.00	1.25	25.00
NE 8724	.22/.28	.70/.95	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30		.80	16.00	1.30	26.00
NE 8739	.35/.42	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30		.80	16.00	1.30	26.00
NE 8744	.40/.47	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30		.80	16.00	1.30	26.00
NE 8749	.45/.52	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30		.80	16.00	1.30	26.00
NE 8817	.15/.20	.70/.95	.040	.040	.20/.35	.40/.60	.40/.60	.30/.40		.90	18.00	1.40	28.00
NE 8949	.45/.52	1.00/1.30	.040	.040	.20/.35	.40/.60	.40/.60	.30/.40		1.20	24.00	1.70	34.00

Note: The extras shown above are in addition to a base price of 2.70c. per 100 lb., on finished products and \$54. per gross ton on semi-finished steel major basing points and are in cents per 100 lb. and dollars per gross ton in semi-finished.

LET'S WIPE THAT SMIRK
OFF MR. HIRO-HITLER



TAKE a good look at this gloating scoundrel . . . our evil enemy . . . the Axis. He's smirking, but by conservation, you can help have him scowling in double-quick time . . . As makers of the Exide-Ironclad Batteries

Exide
IRONCLAD
BATTERIES

used for power in so many material handling operations, we urge regular battery care. Follow these four simple rules and *Save to Win!*

MAKING BATTERIES LAST HELPS STOP THE AXIS!

- 1** Keep adding approved water at regular intervals. Most local water is safe. Ask us if yours is safe.
- 2** Keep the top of the battery and battery container clean and dry at all times. This will assure maximum protection of the inner parts.
- 3** Keep the battery fully charged—but avoid excessive over-charge. A storage battery will last longer when charged at its proper voltage.
- 4** Record water additions, voltage, and gravity readings. Don't trust your memory. Write down a complete record of your battery's life history. Compare readings.

If you wish more detailed information, or have a special battery problem, don't hesitate to write to Exide. We want you to get the long-life built into every Exide Battery. Ask for booklet Form 1982.

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto



PRICES

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

F.o.b. Granite City, add 10c. per 100 lb. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb. on all grades.

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham

	Base per Keg
Standard wire nails	\$2.55
Coated nails	2.55
Cutnails, carloads	3.85
	Base per 100 Lb.
Annealed fence wire	\$3.05
Annealed galvanized fence wire	3.40
	Base Column
Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire†	70
Twisted barbless wire	70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, per Package of 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	\$6.00	\$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent off List

Machine and Carriage Bolts:

½ in. & smaller x 6 in. & shorter	65½
9/16 & ¾ in. x 6 in. & shorter	63½
¾ to 1 in. x 6 in. & shorter	61
1½ in. and larger, all length	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed:

(Hexagon or Square)

½ in. & smaller	62
9/16 to 1 in. inclusive	59
1½ to 1½ in. inclusive	57
1½ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts U.S.S. S.A.E.

7/16 in. and smaller	64
½ in. and smaller	62
½ in. through 1 in.	60
9/16 to 1 in.	59
1½ in. through 1½ in.	57
1½ in. and larger	56

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose

71 and 10	
Stove bolts in packages, with nuts attached	71
Stove bolts in bulk	80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

Large Rivets (½ in. and larger)

Base per 100 lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham \$3.75

Small Rivets (7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham 65 and 5

Cap and Set Screws Per Cent Off List

Upset full fin. hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes	36
Fillister head cap, listed sizes	51

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills (F.o.b. Pittsburgh only on wrought pipe) Base Price—\$200 per Net Ton

Steel (Butt Weld)

	Black	Galv.
½ in.	63½	51
¾ in.	66½	55
1 to 3 in.	68½	57½

Wrought Iron (Butt Weld)

½ in.	24	3½
¾ in.	30	10
1 and 1½ in.	34	16
1½ in.	38	18½
2 in.	37½	18

Steel (Lap Weld)

2 in.	61	49½
2½ and 3 in.	64	52½
3½ to 6 in.	66	54½

Wrought Iron (Lap Weld)

2 in.	30½	12
2½ to 3½ in.	31½	14½
4 in.	33½	18
4½ to 8 in.	32½	17

Steel (Butt, extra strong, plain ends)

	Black	Galv.
½ in.	61½	50½
¾ in.	65½	54½
1 to 3 in.	67	57

Wrought Iron (Same as Above)

½ in.	25	6
¾ in.	31	12
1 to 2 in.	38	19½

Steel (Lap, extra strong, plain ends)

2 in.	59	48½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56

Wrought Iron (Same as Above)

2 in.	33½	15½
2½ to 4 in.	39	22½
4½ to 6 in.	37½	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher on all butt weld.

WAREHOUSE PRICES (Delivered Metropolitan areas, per 100 lb. These prices do not necessarily apply for dislocated tonnage shipments when the f.o.b. City prices are used in conformance with OPA Schedule 49)

CITIES	SHEETS			STRIP		Plates ($\frac{1}{4}$ in. and heavier)	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 ga.)	Cold Rolled	Galv. (24 ga.)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled 2300	Hot Rolled 3100	Cold Drawn 2300	Cold Drawn 3100
Pittsburgh	\$3.35		\$4.65	\$3.60	\$3.20	\$3.40	\$3.40	\$3.35	\$3.65	\$7.45	\$5.75	\$8.40	\$6.75
Chicago	3.25	4.10	4.85 ¹	3.60	3.50	3.55	3.55	3.50	3.75	7.35	5.65	8.40	6.75
Cleveland	3.35	4.05	4.62	3.50	3.20	3.40	3.58	3.25	3.75	7.55	5.85	8.40	6.75
Philadelphia	3.55	4.05 ⁵	4.65	3.51	3.31	3.55	3.55	3.85	4.06	7.31	5.86	8.55	7.16
New York	3.58	4.60 ²	5.00	3.96 ⁶	3.51	3.76	3.75	3.84	4.09	7.60	5.90	8.64	7.19
Detroit	3.43	4.30	4.84 ¹	3.68 [*]	3.40	3.60	3.65	3.43	3.80	7.67	5.97	8.70	7.05
Buffalo	3.25	4.30 ¹	4.75 ⁴	3.82	3.52	3.62	3.40	3.35	3.75	7.35	5.65	8.40	6.75
Boston	3.71	4.68	5.11	4.06	3.46	3.85	3.85	3.98	4.13	7.75	6.05	8.88	7.23
Birmingham	3.45 ³		4.75 ¹	3.70 ³		3.55 ³	3.55 ³	3.50 ³	4.48				
St. Louis	3.39	4.24 ²	4.99 ¹	3.74	3.61	3.69	3.69	3.64	4.02	7.72	6.02	8.77	7.12
St. Paul	3.50	4.35	5.00	3.85	3.83	3.80	3.80	3.75	4.34	7.45	6.00	8.84	7.44
Milwaukee	3.38	4.23 ²	4.98 ¹	3.73	3.54	3.68	3.68	3.63	3.88	7.58	5.88	8.63	6.98
Baltimore	3.50		5.05	4.00		3.70	3.70	3.85	4.04				
Cincinnati	3.42	4.37 ²	4.42 ¹	3.67	3.45	3.65	3.68	3.60	4.00	7.69	5.99	8.50	7.10
Norfolk	3.85		5.40	4.10		4.05	4.05	4.00	4.15				
Washington	3.60			4.10		3.80	3.80	3.95	4.10				
Indianapolis	3.45	4.25	5.01 ¹	3.75	3.28	3.70	3.70	3.60	3.97	7.67	5.97	8.72	7.07
Omaha	3.85		5.52 ¹	4.20		4.15	4.15	4.10	4.42				
Memphis	3.85		5.25	4.10		3.95	3.95	3.90	4.31				
New Orleans	4.05			4.30		3.90	3.90	4.10	4.60				
Houston	4.00			4.30		4.05	4.05	3.75					
Los Angeles †	4.95	7.15	5.95	4.90		4.80	4.60	4.35	6.60	9.55	8.55	10.55	9.55
San Francisco †	4.55	7.05	6.10	4.50		4.65	4.35	3.95	6.80	9.80	8.80	10.80	9.80
Seattle †	4.65 ⁷		5.70 ⁷	4.25		4.75	4.45	4.20	5.75		9.00		

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: 1 500 to 1499 lb. 2 400 to 1499 lb. 3 400 to 3999 lb. 4 450 to 1499 lb. 5 1000 to 1999 lb. 6 0 to 1999 lb. 7 300 to 10,000 lb. At Philadelphia galvanized sheets, 25 or more bundles; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; San Francisco, hot rolled sheets, 400 to 39,999 lb., galvanized and cold rolled sheets, 750 to 4999 lb., cold fin. bars, 0-299 lb.; hot rolled alloy bars, 0-4999 lb.; Seattle, cold finished bars, 1000 lb. and over, hot rolled alloy bars, 0-1999 lb.; Memphis, hot rolled sheets, 400 to 1999 lb., galvanized sheets, 150 and over; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, cold rolled sheets, 300 to 1999 lb.; galvanized sheets, 1 to 6 bundles; cold finished bars, 1 to 99 lb.; SAE bars, 100 lb. Extras for size, quality, etc., apply on above quotations. * 12 gage and heavier, \$3.43. † Los Angeles, San Francisco and Seattle prices reflect special provisions of amendment No. 2 to OPA Price Schedule No. 49.



"FREE MEN — Producing Three Times More Than Slave Men"

Peerless Saws are Helping to Save — TIME...METAL...and BLADES

PEERLESS 14" High Duty Saw, cutting butt end from 155 mm semi-finished shells. As many as 800 pieces are cut with a single, high-speed, 4 tooth, \$1.50 blade.

American tools and free Americans have created a miracle of mass war production . . . have set an impossible pace for Axis slaves to follow. To help these free men produce, Peerless has made practical the faster cutting of metal.

Faster cutting has been made practical with a Peerless — the Saw with the exclusive Four-Sided Saw-Frame, and Backing-Plate Blade-Support. Besides reducing CUTTING TIME; Peerless Saws save METAL, too. The thin, cool-running, straight-cutting blade removes as little as 1/16" of the stock.

BLADE SAVINGS also count up fast in triple-shift, high speed cutting. On a Peerless High Duty as many as 800 butt-end shell cuts are being made with a single blade.* These savings in TIME . . . METAL . . . and BLADES are helping free men to win, and to buy their War Bonds every pay day. More complete details on this 3-way saving will be mailed at your request.

PEERLESS MACHINE COMPANY • RACINE, WISCONSIN

Peerless
METAL SAWING MACHINES

PEERLESS MACHINE COMPANY, Dept. IA-842, Racine, Wisconsin

*Mail complete details on the performance record shown above.....

- ☐ Mail catalog on Hydraulic type Saw for High Production Cutting
- ☐ Mail catalog covering Vertical type used for Die Block Work
- ☐ Mail catalog on Mechanical type Saw for production cutting
- ☐ Mail catalog on general utility and maintenance Saws

Company.....

Individual.....

Street.....

City..... State.....

FAST, ACCURATE CUTTING DEMANDS POSITIVE BLADE CONTROL

BOILER TUBES

Seamless Steel and Lap Weld Commercial
Boiler Tubes and Locomotive Tubes
Minimum Wall

(Net base prices per 100 ft., f.o.b. Pitts-
burgh, in carload lots)

		Seamless	Lap
		Cold Drawn	Hot Rolled
		\$	\$
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66

(Extras for less carload quantities)

40,000 lb. or ft. over.....	Base
30,000 lb. or ft. to 39,999 lb. or ft. 5%	
20,000 lb. or ft. to 29,999 lb. or ft. 10%	
10,000 lb. or ft. to 19,999 lb. or ft. 20%	
5,000 lb. or ft. to 9,999 lb. or ft. 30%	
2,000 lb. or ft. to 4,999 lb. or ft. 45%	
Under 2,000 lb. or ft.	65%

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago.....	\$54.80
6-in. and larger, del'd New York.....	52.20
6-in. and larger, Birmingham.....	46.00
6-in. and larger f.o.b. cars, San Francisco or Los Angeles.....	69.40
6-in. and larger f.o.b. cars, Seattle.....	71.20

Class "A" and gas pipe, \$3 extra; 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is \$45 at Birmingham and \$53.80 delivered Chicago. \$59.40 at San Francisco and Los Angeles, and \$70.20 at Seattle.

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb., gross ton	\$40.00
Angle bars, 100 lb.	2.70
(F.o.b. Pasing Points) Per Gross Ton	
Light rail (from billets)	\$40.00
Light rails (from rail steel)	39.00
Base per Lb.	
Cut spikes	3.00c.
Screw spikes	5.15c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast	2.30c.
Track bolts	4.75c.
Track bolts, heat treated, to rail-roads	5.00c.
Track bolts, jobbers discount	63-5

Basing Points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond

Lake Superior Ores (51.50% Fe.)

(Delivered Lower Lake Ports)

	Per Gross Ton
Old range, bessemer, 51.50	\$4.75
Old range, non-bessemer, 51.50	4.60
Mesaba, bessemer, 51.50	4.60
Mesaba, non-bessemer, 51.50	4.45
High phosphorus, 51.50	4.35

Foreign Ores*

(C.i.f. Philadelphia or Baltimore, Exclusive of Duty)

	Per Unit
African, 46-48 Mn	70c.-75c.
Indian, 48-50 Mn	75c.

Furnace

	Per Net Ton
†Connellsville, prompt	\$6.00

Foundry

†Connellsville, prompt\$6.75 to \$7.00
*Maximum by-product coke prices established by OPA became effective Oct. 1, 1941. A complete schedule of the ceiling prices was published in THE IRON AGE, Sept. 25, p. 94B. Maximum beehive

COKE*

furnace coke prices established by OPA, Jan. 26. †F.O.B. oven.

By-product, Chicago	\$12.25
By-product, New England	\$13.75
By-product, Newark	\$12.40 to \$12.95
By-product, Philadelphia	\$12.38
By-product, Cleveland	\$12.30
By-product, Cincinnati	\$11.75
By-product, Birmingham	\$8.50†
By-product, St. Louis	\$12.02
By-product, Buffalo	\$12.50

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans, Domestic, 80%, per gross ton (carloads)

.....\$135.00

Spiegeleisen

Per Gross Ton Furnace
Domestic, 19 to 21%

Domestic, 26 to 28%

Electric Ferrosilicon

(Per Gross Ton, Delivered Lump Size)

50% (carload lots, bulk)	\$74.50
50% (ton lots, packed)	87.00
75% (carload lots, bulk)	135.00
75% (ton lots, packed)	151.00

Silvery Iron

(Per Gross Ton, base 6.00 to 6.50 Si)

F.o.b. Jackson, Ohio

Buffalo

For each additional 0.50% silicon add

\$1 a ton. For each 0.50% manganese over

1% add 50c. a ton. Add \$1 a ton for

0.75% phosphorus or over.

*Official OPA price established June 24, 1941.

Bessemer Ferrosilicon

Prices are \$1 a ton above Silvery Iron quotations of comparable analysis.

Ferrochrome

(Per Lb., Contained Cr, Delivered Car-
lots, Lump Size, on Contract)

4 to 6 carbon	13.00c.
2 carbon	19.50c.
1 carbon	20.50c.
0.10 carbon	22.50c.
0.06 carbon	23.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

(Per Gross Ton, Delivered, Lump Size,
Bulk, on Contract)

3 carbon	\$113.00*
2.50 carbon	118.00*
2 carbon	123.00*
1 carbon	133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained	
W, del'd carload	\$2.00
Ferrotungsten, 100 lb. and less...	2.25
Ferrovanadium, contract, per lb.	
contained V, del'd	\$2.70 to \$2.90†
Ferrocolumbium, per lb. contained	
Cb, f.o.b. Niagara Falls, N. Y.,	
ton lots	\$2.25†
Ferrocobaltititanium, 15-18 Ti,	
7-8 C, f.o.b. furnace, carload	
contract, net ton	\$142.50
Ferrocobaltititanium, 17-20 Ti,	
3-5 C, f.o.b. furnace, carload	
contract, net ton	\$157.50
Ferrophosphorus, electric or blast	
furnace materials, carloads,	
f.o.b. Anniston, Ala., for 18%,	
with \$3 unitage freight, equalled	
with Rockdale, Tenn., gross ton.	\$58.50
Ferrophosphorus, electrolytic 23-	
26%, carlots, f.o.b. Monsanto	
(Siglo), Tenn., \$3 unitage,	
freight equalized with Nashville,	
gross ton	\$75.00
Ferromolybdenum, per lb., Mo,	
f.o.b. furnace	95c.
Calcium molybdate, per lb. Mo,	
f.o.b. furnace	80c.
Molybdenum oxide briquettes 48-	
52 Mo, per lb. contained Mo,	
f.o.b. Langeloth, Pa.	80c.
Molybdenum oxide, in cans, per lb.	
contained Mo, f.o.b. Langeloth,	
and Washington, Pa.	80c.

*Spot prices are \$5 per ton higher.

†Spot prices are 10c. per lb. of contained element higher.

FLUORSPAR

Fire Clay Brick

Domestic washed gravel, 85-5 f.o.b.

Kentucky and Illinois mines, all

rail

Domestic, f.o.b. Ohio River landing

barges

No. 2 lump, 85-5 f.o.b. Kentucky

and Illinois mines

Foreign, 85% calcium fluoride, not

over 5% Cl, c.i.f. Atlantic ports,

duty paid

Domestic No. 1 ground bulk, 95 to

98% calcium fluoride, not over

2½% silicon, f.o.b. Illinois and

Kentucky mines

As above, in bags, f.o.b. same

mines

ORES

Per Net Ton

Tungsten, Chinese, Wolframite, duty

paid, delivered

Tungsten, domestic scheelite, at

mine

Chrome ore, lump, c.i.f. Atlantic

Seaboard, per gross ton; South

African (low grade)

Rhodesian, 45

Rhodesian, 48

*Importations no longer readily avail-
able. Prices shown are nominal.

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

Per 1000

Super-duty brick, St. Louis

First quality, Pennsylvania, Mary-

land, Kentucky, Missouri and

Illinois

First quality, New Jersey

Second quality, Pennsylvania, Mary-

land, Kentucky, Missouri and

Illinois

Second quality, New Jersey

No. 1, Ohio

Ground fire clay, net ton

..... 7.60

Silica Brick

Pennsylvania

Chicago District

Birmingham

Silica cement, net ton (Eastern) ..

..... 9.00

Chrome Brick

Per Net Ton

Standard, f.o.b. Baltimore, Plym-

outh Meeting and Chester

Chemically bonded, f.o.b. Baltimore,

Plymouth Meeting and Chester

Pa.

..... 54.00

Magnesite Brick

Standard f.o.b. Baltimore and Ches-

ter

Chemically bonded, f.o.b. Baltimore

..... 65.00

Grain Magnesite

Domestic, f.o.b. Baltimore and Ches-

ter in sacks (carloads)

Domestic, f.o.b. Chewelah, Wash.

(in bulk)

..... 22.00

FUEL OIL

No. 6 Bur. Std., del'd Chicago....

4.75c.

No. 3 distillate del'd Cleveland....

6.50c.

No. 4 indus., del'd Cleveland

6.00c.

No. 5 indus., del'd Cleveland

5.25c.

No. 6 indus., del'd Cleveland

5.25c.